

# AGRI. BUSINESS SUPPLEMENT

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# **HYDROPONICS: GROWING MEDIA** **AND GROWING SYSTEMS**

(Afshan Akhtar, Intern, Department of Agriculture (Hydroponic), PMAS\_AAUR, Rawalpindi)



## **INTRODUCTION:**

Hydroponics is a method of growing plants without soil, where plants receive essential nutrients directly through a nutrient-rich water solution and are supported by a suitable growing medium. Since the grower can control the supply of nutrients, water, and light, hydroponic crops can grow faster and use significantly less water than crops grown in open fields.

This method is becoming popular in cities, greenhouses, and even homes because it does not need large farmland and can be set up almost anywhere there is space, water, and light. As fresh water becomes harder to find in many regions, hydroponics offers a practical way to grow food using a fraction of the water that normal farming needs.

## **WHAT IS GROWING MEDIA AND WHY IT MATTERS**

In hydroponics, the growing medium is the material that holds the plant upright and keeps its roots in place, since there is no soil to do this

job. A good growing medium also helps roots get enough air and water pass through easily. Some media hold a little water for the plant, while others simply act as an anchor and let the roots stay bathed in nutrient solution.

Choosing the right medium depends on the type of plant, the growing system being used, and how much water and air the roots need. Below are the growing media used most often by hydroponic growers.



### **a) Rockwool**

Made from melted rock spun into soft fibres, rockwool holds water well while still letting air reach the roots. It is one of the most widely used media for starting seeds and for larger growing systems.

### **b) Clay Pebbles (LECA)**

These are small, round balls of baked clay. They are light, reusable, and drain very quickly, which makes them a favourite for systems where roots need frequent contact with air, such as flood-and-drain setups.

#### **c) Coco Coir**

Made from crushed coconut husks, coco coir is a natural, eco-friendly medium that holds moisture well while still draining extra water. It is gentle on young roots and is often mixed with other media.

#### **d) Perlite**

This is a light, white volcanic material that looks like small foam balls. It is mainly used to improve drainage and add air pockets, and is often mixed with coco coir or peat moss rather than used alone.

#### **e) Vermiculite**

A soft, flaky mineral that holds a lot of water, vermiculite is useful for seed starting and for plants that need consistently moist roots. Because it holds so much water, it is usually blended with a faster-draining medium like perlite.

#### **f) Peat Moss**

A natural material formed from decomposed plant matter, peat moss retains moisture well and gives young seedlings a soft place to root. It is commonly blended into starter plugs for germinating seeds.

### **TYPES OF HYDROPONIC GROWING SYSTEMS**

While growing media supports the plant, the growing system is the overall setup that delivers water and nutrients to the roots. There are several well-known types of hydroponic systems, each suited to different crops, budgets, and spaces. The most common hydroponic growing system designs are briefed here:

#### **1. Wick System**

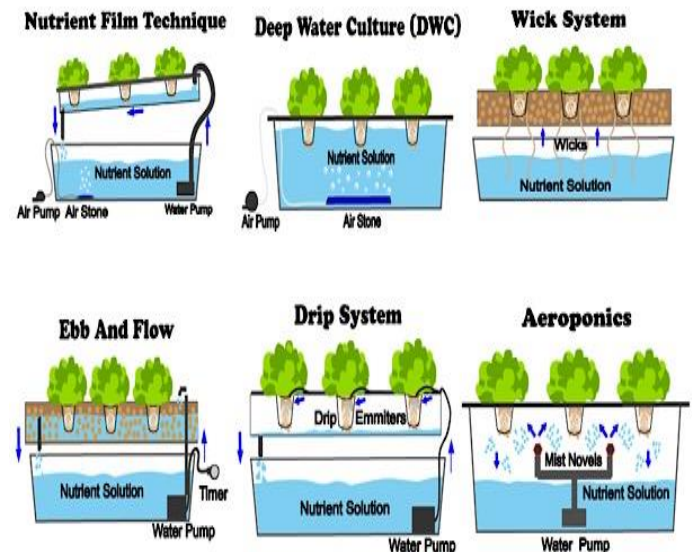
The simplest type of hydroponic system. A wick, similar to a thick piece of rope, draws nutrient solution up from a reservoir into the growing medium above it. It has no pumps or moving parts, making it low-cost and beginner-friendly, though it works best for small plants.

#### **2. Deep Water Culture (DWC)**

Plant roots hang directly in a tank of oxygenated nutrient solution, usually with an air pump keeping the water bubbling. This system grows plants quickly since roots have constant access to water, nutrients, and oxygen.

#### **3. Nutrient Film Technique (NFT)**

A thin, continuously flowing film of nutrient solution runs along a sloped channel, passing over the plant roots before draining back to the reservoir and being pumped around again. It is popular for growing leafy greens on a larger, commercial scale.



#### **4. Ebb and Flow (Flood and Drain)**

The growing tray is periodically flooded with nutrient solution from below and then allowed to drain back into the reservoir. This flood-and-drain

cycle gives roots bursts of nutrients followed by fresh air, and works well for a wide variety of plants.

### 5. Drip System

Nutrient solution is slowly dripped onto the base of each plant through small tubes, similar to drip irrigation used in regular farming. It is easy to scale up and is one of the most common systems used by commercial hydroponic farms.

### 6. Aeroponics

Roots hang in the air inside a closed chamber and are misted with nutrient solution at regular intervals. Because roots get plenty of oxygen, this method can produce very fast growth, though it needs careful monitoring since roots can dry out quickly if the misting stops.

### BENEFITS OF HYDROPONIC GROWING

Hydroponics offers several advantages over traditional soil farming, especially in places where water, land, or good soil is limited.



- Uses significantly less water than soil farming, since water is recirculated instead of soaking into the ground.

- Plants often grow faster and produce higher yields because nutrients are delivered directly to the roots.
- Can be set up indoors, in greenhouses, or in small urban spaces, bringing farming closer to cities.
- Reduces problems from soil-borne diseases, weeds, and many common pests.
- Allows precise control over nutrients, which can improve the quality and consistency of crops.

### CHALLENGES TO KEEP IN MIND

Despite its benefits, hydroponics is not without difficulties, especially for new growers.

- Starting costs can be high, since pumps, lights, tanks, and monitoring tools all add up.
- Systems depend on electricity to run pumps, lights, and air stones, so a power failure can quickly stress plants.
- Growers need to regularly check water pH and nutrient levels, which takes more attention than watering soil.
- A problem such as a clogged pump or contaminated reservoir can affect all connected plants at once.
- Some knowledge and practice are required to keep the system balanced and disease-free.

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# **GREEN BANKING REGULATIONS: DRIVING SUSTAINABLE FINANCE FOR A GREENER FUTURE**

*(Faheem Haider, Unit Head Green Banking, Agriculture Technology Department, ZTBL)*



## **INTRODUCTION**

The increasing challenges of climate change, environmental degradation, & resource depletion have considerably increased need for sustainable financial practices. Financial institutions play a crucial role in directing capital toward environmentally responsible activities while managing climate-related risks. In response, regulators across the world have introduced **Green Banking Regulations** to encourage banks to integrate environmental and social considerations into their business operations and lending decisions.

Green Banking Regulations provide a framework that enables banks to promote sustainable development, reduce environmental risks, and contribute to national and international climate objectives. These regulations not only encourage

financing of green projects but also strengthen risk management, transparency, and corporate governance within the banking sector.

## **WHAT ARE GREEN BANKING REGULATIONS?**

Green Banking Regulations are policies, guidelines, and regulatory frameworks issued by central banks, financial regulators, and governments to promote environmentally sustainable banking practices. These regulations require financial institutions to consider environmental and climate-related risks while providing financial services.

The primary objectives of Green Banking Regulations include:

- Promoting sustainable and green finance.
- Managing environmental and climate-related financial risks.
- Encouraging investments in renewable energy and energy-efficient technologies.
- Supporting sustainable agriculture, forestry, and clean transportation.
- Reducing the environmental footprint of banking operations.
- Enhancing transparency through sustainability reporting and disclosures.

## **GLOBAL REGULATORY DEVELOPMENTS**

Green Banking Regulations are increasingly aligned with internationally recognized sustainability reporting and disclosure frameworks. Many financial institutions are adopting following regulations:

- IFRS Sustainability Disclosure Standards (IFRS S1 and IFRS S2) developed by the *International Sustainability Standards Board (ISSB)* to improve transparency in sustainability and climate-related reporting.
- Global Reporting Initiative (GRI) Standards provide guidance for reporting environmental, social, and governance (ESG) performance.
- Task Force on Climate-related Financial Disclosures (TCFD) have significantly influenced climate risk reporting practices adopted by banks worldwide.

## **KEY COMPONENTS OF GREEN BANKING REGULATIONS**

Green Banking Regulations cover a range of practices that enable banks to manage environmental risks while supporting sustainable and responsible financing. Some of the major components are as follows:

### **a) Environmental and Social Risk Management (ESRM)**

One of the key regulatory requirements is the implementation of Environmental and Social Risk Management (ESRM). It enables banks to assess the environmental and social risks of financed projects before making lending decisions.

### **b) Green Finance and Sustainable Lending**

Green Banking Regulations encourage banks to increase financing for environmentally beneficial sectors such as:

- Renewable energy

- Energy-efficient buildings
- Sustainable agriculture
- Forestry and afforestation
- Waste management
- Water conservation
- Clean transportation
- Climate-resilient infrastructure

### **c) Climate Risk Management**

Climate change introduces both physical risks and transition risks for financial institutions.

- Physical risks include floods, droughts, heatwaves, and extreme weather events that can affect borrowers' repayment capacity.
- Transition risks arise from changing environmental regulations, technological advancements, and market shifts toward low-carbon industries.

Green Banking Regulations require banks to identify, measure, monitor, and manage these risks as part of their enterprise risk management framework.

### **d) Sustainability Reporting and Disclosure**

Transparency has become an essential element of Green Banking Regulations.

Many regulators now encourage or require banks to disclose:

- Green financing activities
- Climate-related risks
- Environmental performance
- Carbon emissions
- ESG initiatives

- Sustainable investment portfolios

These disclosures improve stakeholder confidence and enable investors to make informed decisions.

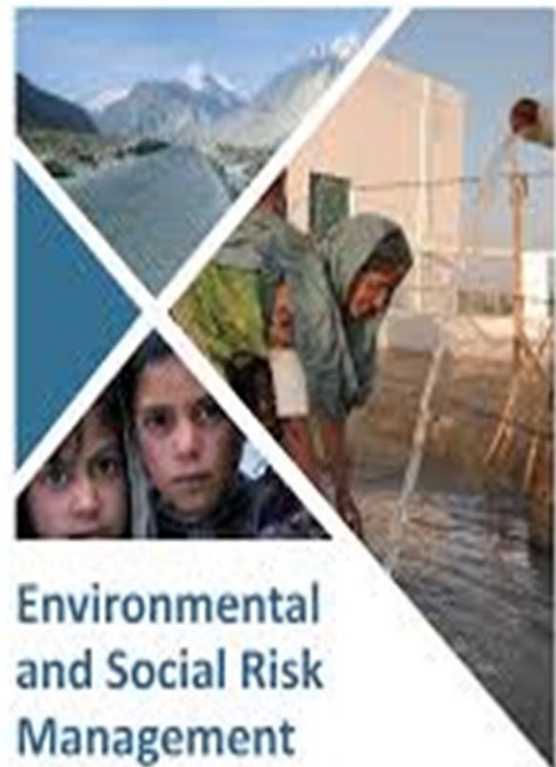
### **GREEN BANKING REGULATIONS IN PAKISTAN**

Pakistan has made notable progress in promoting sustainable finance through regulatory initiatives introduced by the State Bank of Pakistan (SBP). Recognizing the financial risks associated with climate change and environmental degradation, SBP has encouraged banks and Development Finance Institutions (DFIs) to integrate sustainability into their business strategies and financing practices.

- **SBP Green Banking Guidelines** provide a roadmap for financial institutions to adopt environmentally responsible banking practices. These guidelines encourage banks to establish dedicated Green Banking Units, integrate Environmental Risk Management (ESRM) into lending decisions, expand financing for renewable energy, sustainable agriculture, and other green sectors, promote digital and paperless banking, and regularly monitor and report Green Banking performance to senior management and the Board.
- **ESRM Implementation Manual:** The State Bank of Pakistan has issued the Environmental and Social Risk Management (ESRM) Guidelines, providing banks with a framework to manage

environmental and social risks in lending decisions.

- **Pakistan Green Taxonomy** provides a common framework for identifying and classifying environmentally sustainable economic activities. It helps banks and financial institutions determine whether a project qualifies as green, promotes consistency in green financing, and supports greater transparency in sustainable investment decisions.



### **Environmental and Social Risk Management**

Implementation Manual  
2022



ENVIRONMENTAL, HOUSING, AND SOCIAL RISK MANAGEMENT  
STATE BANK OF PAKISTAN

## SBP UPDATES

### **SBP LAUNCHES “CYBER SHIELD” CYBER RESILIENCE STRATEGY**

The State Bank of Pakistan (SBP) has launched “Cyber Shield – the Cyber Resilience Strategy for Regulated Entities” under its Vision 2028 agenda to strengthen cybersecurity across the banking and financial sector. The strategy aims to protect banks and financial institutions from evolving cyber threats while ensuring secure and uninterrupted financial services for customers and businesses. It focuses on enhancing cyber resilience, strengthening governance, promoting sector-wide collaboration and information sharing, developing skilled cybersecurity professionals, and continuously improving security practices. Through this initiative, SBP seeks to support secure digital innovation, safeguard customers, and maintain the stability of Pakistan’s financial system.

### **GOVERNOR SBP CALLS FOR SCALING UP ZARKHEZ-E TO EXPAND AGRICULTURAL CREDIT**

Governor SBP urged banks to scale up Zarkhez-e, SBP’s flagship digital agricultural lending platform, to expand credit access for small farmers and underserved areas. He highlighted that agricultural credit reached a record Rs. 2,577 billion in FY25, while disbursements during the first half of FY26 stood at Rs. 1,412 billion. The Governor emphasized strengthening digital lending, crop loan insurance, warehouse receipt financing, and partnerships with fintechs and provincial governments to improve financial inclusion. He also called on banks to expand borrower outreach, enhance support for small farmers, and promote sustainable agricultural

growth through innovative and technology-driven financing solutions.

### **SBP BEGINS IMPLEMENTATION OF WE-FINANCE CODE TO EMPOWER WOMEN ENTREPRENEURS**

The State Bank of Pakistan (SBP) has launched the implementation of the WE-Finance Code to improve women entrepreneurs’ access to finance and promote an inclusive financial system. Led by SBP in collaboration with the Asian Development Bank (ADB), the initiative brings together 23 financial institutions and the Pakistan Banks Association to address financial barriers faced by women-led businesses. A consultative workshop focused on gender-responsive financial products, improved data collection, and stronger lending mechanisms for women-led MSMEs. Through this initiative, SBP aims to expand financial inclusion, strengthen women’s entrepreneurship, and support sustainable economic growth in Pakistan.

### **SBP KEEPS POLICY RATE UNCHANGED AT 10.5%**

The State Bank of Pakistan (SBP) has decided to keep the policy rate unchanged at 10.5% to maintain price stability while supporting sustainable economic growth. The Monetary Policy Committee observed that headline inflation eased to 5.6% in December 2025, while economic activity continued to strengthen, with GDP growth reaching 3.7% in Q1-FY26 and projected to remain between 3.75% and 4.75% for the full fiscal year. Although the trade deficit widened due to higher imports, strong workers’ remittances and stable global commodity prices helped contain the current account deficit. The Committee also highlighted improving business and consumer confidence, rising private sector credit, and stronger foreign exchange reserves. Looking ahead, SBP expects inflation to remain within its 5–7% target range over the medium term while continuing to support macroeconomic stability and sustainable economic growth.

# MANAGEMENT TIPS

## Robots Are Coming — but Not Everywhere

Humanoid robot technologies are advancing rapidly across industries, but unlike generative AI, their adoption is unlikely to occur uniformly or at the same pace. Managers should therefore avoid assuming a universal adoption model and instead develop strategies that recognize the diverse technical, operational, and business requirements of robotics implementation. The following management tips provide guidance for organizations preparing for the gradual and uneven adoption of humanoid robots.

### 1. Recognize That One Robot Cannot Do Every Job

Avoid assuming that a single humanoid robot can perform all workplace functions. Different industries require different capabilities, making specialized robots more practical than universal models.

### 2. Match Robot Design to Task Requirements

Evaluate the specific physical, cognitive, and interaction requirements of each task before investing in robotics. Warehouse operations, healthcare, hospitality, and manufacturing each demand different technical capabilities.

### 3. Assess the Business Case Before Deployment

Do not adopt humanoid robots simply because the technology is available. Carefully evaluate costs, productivity improvements, maintenance requirements, and return on investment for each use case.

### 4. Prioritize High-Value Applications

Deploy humanoid robots first in environments where they provide the greatest operational benefit, such as repetitive, hazardous, or labor-intensive tasks, rather than attempting organization-wide implementation.

### 5. Prepare for Different Technology Configurations

Recognize that robots performing physically demanding work require powerful actuators and mechanical systems, while customer-facing or caregiving robots require advanced perception, communication, and emotional interaction capabilities.

### 6. Invest in Human–Robot Collaboration

Focus on designing workplaces where robots complement employees rather than replace them. Human oversight, judgment, and decision-making remain essential for many complex tasks.

### 7. Develop Workforce Skills Alongside Robotics

Provide employees with training to operate, supervise, maintain, and collaborate with humanoid robots. Successful adoption depends on both technological capability and workforce readiness.

### 8. Expect Gradual and Uneven Adoption

Avoid planning based on the assumption that robotics will spread as rapidly as generative AI. Adoption will differ across industries, organizations, and geographic regions depending on technical feasibility and economic value.

### 9. Build Flexible Robotics Strategies

Develop implementation plans that can adapt as robotics technology evolves. Organizations should remain flexible rather than committing to a single long-term deployment model.

## Conclusion

By aligning robotics investments with specific operational needs, preparing the workforce, and adopting flexible implementation strategies, managers can maximize the benefits of humanoid robotics while ensuring sustainable and effective organizational transformation.

## Reference:

*MIT Sloan Management Review*

## NATIONAL NEWS

### **SINDH EXCEEDS FEDERAL WHEAT CULTIVATION TARGET FOR 2025–26 THROUGH FARMER SUBSIDY SUPPORT**

Sindh has surpassed the federal wheat cultivation target for 2025–26 by achieving 14,95,589 hectares against the assigned 14,16,430 hectares, marking a 5.6% increase. This milestone was largely driven by the provincial wheat growers support Program aimed at assisting small and medium-scale farmers. Under the initiative, farmers cultivating 1 to 25 acres received Rs 22,000 per acre as subsidy support for DAP and urea fertilizers. The financial assistance reduced input costs and encouraged expansion of wheat acreage despite rising agricultural expenses. As a result, the province strengthened its contribution to food security and demonstrated improved agricultural performance.

### **GUIDELINES FOR ENHANCING COTTON PRODUCTIVITY**

During a technical advisory meeting at a cotton research institute in Multan, experts and officials presented recommendations for early cotton cultivation. Emphasis was placed on soil testing, balanced fertilizer application, and use of certified seed. Officials also highlighted proper land preparation, bed-and-furrow sowing, and maintaining recommended plant spacing. Integrated pest management and timely seed treatment were identified as essential measures to protect the crop and improve yields.

### **INITIATIVES TO STRENGTHEN CITRUS PRODUCTION**

In a steering committee meeting on citrus development, provincial authorities reviewed progress on initiatives aimed at improving orchard health and productivity. Officials highlighted the establishment of 11 screen houses, primarily in Sargodha, as a key step to address disease challenges and promote quality planting material. The chair directed that implementation be expedited, with strict adherence to technical standards and engagement of competent firms to ensure timely and effective execution of the program.

### **EXPANSION OF PROTECTIVE BAG TECHNOLOGY IN MANGO SECTOR**

The adoption of mango protection bags in Pakistan is projected to reach around 10 million units in 2026, supported by improved export competitiveness and higher market returns. The initiative has led to a significant improvement in export value, as bagged mangoes are fetching prices up to 70 percent higher than non-bagged fruit, with a 5kg pack increasing from about \$17–18 to nearly \$30 in international markets. The use of these bags has also contributed to better fruit quality by reducing pest attacks, sunburn, and post-harvest losses. Their adoption has grown steadily from an initial pilot phase of around 150,000 bags to nearly 1 million bags in 2025, indicating strong uptake among growers and exporters. The program was initiated by the Pakistan Horticulture Development and Export Company to enhance export quality and reduce pesticide dependency.

**Source:** *Business Recorder*

## **ZTBL NEWS**

### **MANAGEMENT OF CLOSED LOAN PASSBOOKS AND CHEQUE BOOKS**

ZTBL has issued revised instructions for the secure management of original passbooks and cheque books of closed loan files, while reiterating the strict prohibition on obtaining borrowers' signed blank cheques or forms. Branches have been directed to securely store and maintain proper records of passbooks, ensure timely disposal of cheque books in accordance with the Operations Manual, and continue efforts to return passbooks to borrowers. The circular also requires quarterly compliance reporting and emphasizes that any violation of these instructions or recurrence of SBP observations will attract strict disciplinary action under a zero-tolerance policy.

### **ZTBL EXPANDS ISLAMIC BANKING THROUGH NEW BANKING WINDOWS**

ZTBL has approved the establishment of 16 new Islamic Banking Windows (IBWs) within selected conventional branches across Pakistan to expand the reach of its Shariah-compliant banking services. The initiative, implemented under the Bank's Annual Islamic Banking Window Expansion Plan, will utilize existing branch infrastructure to provide cost-effective Islamic banking products and services. The new IBWs will become operational in phases, with the Islamic Banking Group coordinating all necessary arrangements for their successful launch.

### **ZTBL INTRODUCES ELECTRONIC DEPOSIT RECEIPTS (EDR) FOR SECURE BANKING**

ZTBL has implemented Electronic Deposit Receipts (EDRs) in compliance with State Bank of Pakistan (SBP) directives to strengthen internal controls and prevent parallel banking activities. Under the new system, customers will continue using manual deposit slips, while a system-generated EDR will be automatically issued after each successful transaction, providing secure and immediate acknowledgment. The initiative enhances fraud prevention, improves record keeping, strengthens audit transparency, and standardizes transaction documentation. All branches have been directed to implement the EDR process without exception and ensure that every customer receives an Electronic Deposit Receipt before leaving the branch.

### **ZTBL ISSUES GUIDELINES FOR FACILITATING PEP ACCOUNT OPENING**

ZTBL has issued revised guidelines, in line with State Bank of Pakistan (SBP) directives, to ensure the smooth and timely opening of bank accounts for Politically Exposed Persons (PEPs). Branches have been instructed to adopt a risk-based approach, apply Enhanced Due Diligence (EDD) proportionately, and avoid unnecessary delays or discriminatory treatment solely based on PEP status. This also emphasizes proper record maintenance, staff awareness, timely complaint resolution, and strict compliance with SBP's AML/CFT requirements to ensure transparent and customer-friendly banking services.