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KFW

UNLOCKING GROWTH

SEASON 04

GROWING PREMIUM PRODUCE WITH FAR LESS WATER

HYDROPONIC FARMING IN PAKISTAN

Unlocking Growth series produced by Pakistan & Counting with Accelerate Prosperity, funded by BMZ (Federal Ministry for Economic Cooperation and Development) through KfW (Kreditanstalt für Wiederaufbau).
pakistanandcounting.com

PAKISTAN &COUNTING

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Section 01

INTRODUCING THE OPPORTUNITY

01

What hydroponics is, how big the market is, and what is driving its growth

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WHAT HYDROPONICS IS

Hydroponics means growing plants without soil. Essential minerals are dissolved in water and delivered straight to the roots.

01

Minerals dissolve in water

This mix is called the nutrient solution.

→

02

The solution reaches the roots

Pumps or channels carry it to each plant.

→

03

Roots sit in water or a soil-free medium

For example coco coir (coconut fibre) or perlite (expanded volcanic rock).

WHAT THE GROWER CONTROLS

- **Nutrient mix**
- **Acidity (pH)**
- **Temperature**

NOT THE SAME AS VERTICAL FARMING

Hydroponics is the growing method. Vertical farming stacks crops in layers and can use it; a single-level greenhouse can use it too.

Source: FAO, Growing without soil: hydroponics fundamentals, pros and cons (2024); PMAS-Arid Agriculture University, Institute of Hydroponic Agriculture; South Africa DAFF, Hydroponic Vegetable Production Guide (2011).

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THE GLOBAL HYDROPONICS MARKET

A fast-growing but loosely measured market. Research firms define it differently, so their totals do not match.

SOURCE	2026 MARKET SIZE (USD)	GROWTH AND FORECAST
Mordor Intelligence	**6.80B**	10.3% a year to 2031 (USD 11.10B)
Precedence Research	**7.01B**	12.37% a year to 2035 (about USD 20B)
360iResearch	**10.33B**	13.5% a year to 2032 (USD 22.23B)
RootsAnalysis	**16.80B**	10.18% a year to 2040 (USD 65.25B)
Research and Markets	**19.47B**	13% a year to 2030 (USD 31.78B)

Source: Mordor Intelligence; Precedence Research; 360iResearch; RootsAnalysis; Research and Markets (2026).

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NO SINGLE AUTHORITATIVE FIGURE

Published 2026 estimates run from about USD 7B to USD 20B. The firms broadly agree on direction.

USD 7–20B

Size of the global market in 2026

Depending on which research firm you ask.

10–13.5%

Yearly growth in most forecasts

One slower forecast, TechSci Research, expects 7.5% a year (USD 12.34B in 2024 to USD 19.05B in 2030).

12.2%

Asia-Pacific growth a year to 2031

The fastest-growing region, according to Mordor Intelligence.

Source: Mordor Intelligence; Precedence Research; 360iResearch; RootsAnalysis; Research and Markets; TechSci Research (2026).

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WHERE THE GROWTH COMES FROM

01

Water scarcity

Water is running short and getting more expensive.

02

Less farmland, bigger cities

Land for farming is limited as cities grow.

03

Climate volatility

Unpredictable weather favours controlled production.

04

Demand for quality

Buyers want consistent, traceable, pesticide-reduced fresh produce.

05

Year-round supply

Crops can be grown all year, close to city customers.

06

Asia-Pacific momentum

The fastest-growing region, at 12.2% a year to 2031.

Source: Mordor Intelligence; Pakistan & Counting research dossier (October 2026).

Section 02

THE LOCAL PICTURE

A small group of operators and one government institute, with no official count of the market

02

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PAKISTAN TODAY: EARLY STAGE, WITH NO OFFICIAL COUNT

No source sizes Pakistan’s hydroponics market. What exists is a small group of named operators and one government institute.

INDICATOR	STATUS
Hydroponics market size, Pakistan	No published figure
National acreage under hydroponics	No published figure
Total capital invested to date	No published figure
Operators at global or regional scale	None. All are single-site or small multi-site
Independent data on yields, margins and payback	None. Operator figures are self-reported

Source: Pakistan & Counting research dossier (October 2026), based on a targeted search of published sources.

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WHO IS GROWING HYDROPONICALLY TODAY

OPERATOR	WHERE	WHAT THEY DO
Fareed Farms	Faisalabad	Hydroponic tomatoes, cucumber and capsicum; operating since about 2011–12
Aether	Islamabad	Turnkey hydroponic systems for clients, plus its own “hyperlocal” produce
Sohail Ahmed’s urban farm	Karachi	Indoor vertical farm for leafy greens, since 2016
Sulit Agro	Hyderabad	Solar-powered indoor vertical farm; registered 2022, first produce January 2024
HydroGrow Pakistan	Pakistan	Turnkey “Build-Operate-Train-Transfer” model
Pak Agro Fodders	Gujrat	Hydroponic fodder (animal feed) for livestock

Source: Express Tribune (2012); ProPakistani and VerticalFarmDaily (2022); Agritecture (2019); Arab News Pakistan (2024); HydroGrow Pakistan; PAK AGRITECH Ventures.

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THE PUBLIC ANCHOR: INSTITUTE OF HYDROPONIC AGRICULTURE

Based at PMAS-Arid Agriculture University, Rawalpindi (near Rawat).

13.5
Acres of hydroponic land

5
Acres under automated greenhouses

2005
Hydroponic activity begins

2016
Formalised as an institute

AREA	WHAT IT DOES
Role	Research, teaching and government-funded (ADP) farmer training on hydroponic greenhouses across Punjab
Also	Develops indigenous hydroponic units to bring component costs down

Source: PMAS-Arid Agriculture University, Institute of Hydroponic Agriculture.

Section 03

WHAT'S THE GAP? WHY NOW?

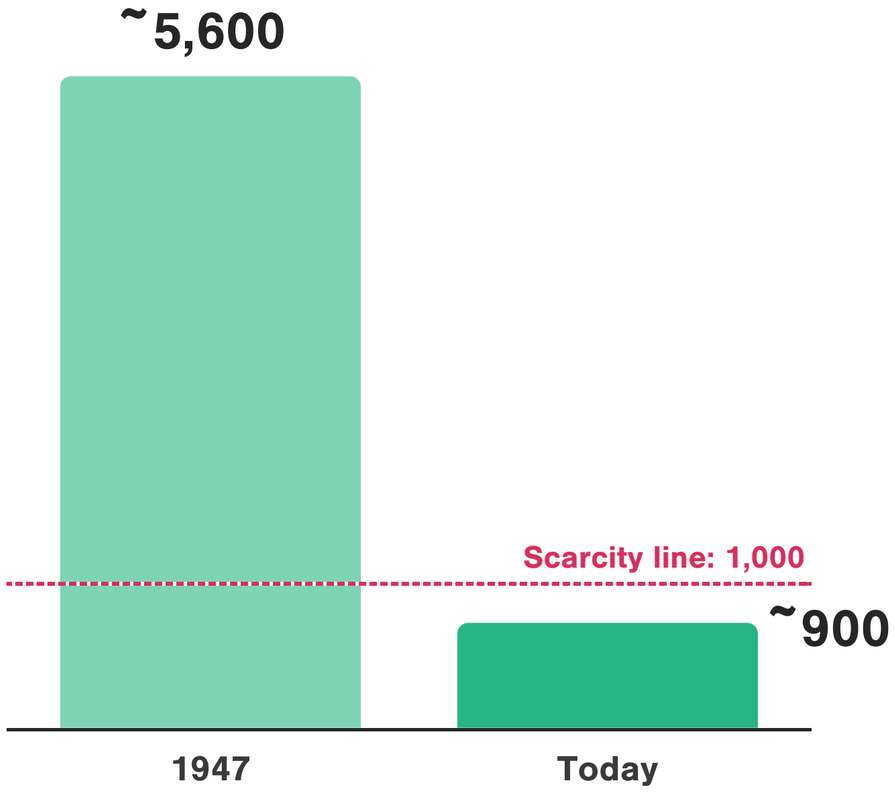
A shrinking water supply, the conditions now converging, and what held the sector back

SECTION 03 · WHAT'S THE GAP? WHY NOW?

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THE GAP: FARMING IS RUNNING INTO A WATER LIMIT

WATER PER PERSON (M³ A YEAR)



Source: FAO AQUASTAT via World Bank; APP; Dawn and Profit (Pakistan Today), June 2026; Pakistan Today (April 2026); Pakistan Economic Survey 2025-26; FAO, No soil, no problem (2026).

90%+

Agriculture's share of freshwater use

14th

Most water-stressed country

June 2026 report; 14th–17th depending on the index.

18.1%

Below-normal Indus Basin snow, 2026

23.4%

Agriculture's share of GDP, FY2025-26

The sector grew 2.89%.

Up to 90% **less water with hydroponics than conventional farming. Actual savings vary by crop and system.**

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WHY NOW: WHAT HAS CHANGED

TAILWIND	DETAIL
The water crisis is now documented	A June 2026 report ranked Pakistan 14th most water-stressed, and Indus Basin snow persistence was 18.1% below normal in 2026.
Scientists are calling for it	NARC scientists Muhammad Adnan Aslam and M. Hanif have publicly urged a shift to vertical hydroponic agriculture (2024–2026 reporting). This is advocacy, not yet a funded programme.
Local know-how exists	The Institute of Hydroponic Agriculture (Rawalpindi) has trained Punjab farmers on hydroponic greenhouses under a government-funded (ADP) project.
An open door for investors	Investment Policy 2023 allows 100% foreign ownership in corporate farming (60% in other agriculture). SIFC, the PM-chaired single-window council, lists 26 public-sector agri-food projects worth USD 2.5B. This covers agriculture in general, not hydroponics specifically.

Source: Dawn; Profit (Pakistan Today); Pakistan Today; INP/WealthPK; PMAS-Arid Agriculture University; FAO Pakistan Investment Proposal.

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WHAT HAS CHANGED / 2

TAILWIND	DETAIL
Agritech support	NIC Faisalabad incubates agritech startups. Research and innovation grants of up to PKR 10M are reported.
Solar finance (conditions apply)	The State Bank’s renewable-energy scheme caps markup at 6% a year for intermediaries that lease or sell solar equipment to end users. Eligibility for hydroponic farms is not confirmed, and indoor farms need far more continuous power than an irrigation pump.
Youth finance has backed a farm	Sulit Agro’s Rs20M setup in Hyderabad is reported as set up under the Prime Minister’s Kamyab Jawan Youth Entrepreneurship Scheme.

THE NUANCE **No single policy has unlocked this category. Several conditions are converging while the water constraint becomes more urgent.**

Source: NIC Faisalabad; Startup.pk; State Bank of Pakistan; Arab News Pakistan.

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WHAT WAS BLOCKING IT

Three things held hydroponics back most: unreliable and costly power, a thin base of local technical skill, and a small premium customer base concentrated in a few cities.

Unreliable, costly power

Pumps circulate the nutrient solution, and indoor farms add lighting and cooling. An outage can mean crop loss.

High upfront cost

Structures, pumps, controls and backup power are paid for before the first harvest.

Imported inputs and equipment

In 2012, Fareed Farms imported tomato seed from Canada and other materials from China and Sri Lanka.

Thin technical skill

Growers used to soil must learn nutrient and pH management. Poor training raises the risk of failure and low yields.

A small premium market

Premium buyers are hotels, restaurants, cafes and modern retail in the big cities.

Little independent evidence

No independent data on yields, margins or payback at commercial scale.

Source: SDPI, Hydroponic Agriculture (2024); Express Tribune (2012); FAO; Pakistan & Counting research dossier.

Section 04

WHY PAKISTAN CAN ENTER THIS

A real need for water efficiency, a head start in local know-how, and a proven international precedent

04

PAKISTAN &COUNTING

PAKISTAN'S ADVANTAGE

01

NECESSITY

Agriculture uses over 90% of a shrinking water supply. A method that can use up to 90% less water has real value wherever its produce can earn a premium.

02

A HEAD START IN KNOW-HOW

Operators have grown hydroponic produce here since about 2011–12, and a government institute has trained farmers since the mid-2000s.

WORTH NOTING

The advantage is need and know-how, not cheap inputs: seed and specialist equipment have often been imported.

Source: FAO AQUASTAT via World Bank; Express Tribune (2012); PMAS-Arid Agriculture University.

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TWO DECADES OF LOCAL PRACTICE

2005

Hydroponic activity begins at PMAS-Arid Agriculture University

~2011–12

Fareed Farms starts growing in Faisalabad

2016

Institute of Hydroponic Agriculture formalised; Karachi vertical farm opens

2022

Sulit Agro registered; Aether reports 1,200–1,300 clients

Jan 2024

Sulit Agro harvests its first produce

Source: PMAS-Arid Agriculture University; Express Tribune (2012); Agritecture (2019); ProPakistani and VerticalFarmDaily (2022); Arab News Pakistan (2024).

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LOCAL SUCCESS STORIES

OPERATOR	WHAT THEY HAVE DONE	WHY IT MATTERS
Fareed Farms (Faisalabad)	Founded about 2011–12 by Tahir Rana, a nuclear physicist who left a job in Canada. Grows three tomato varieties, cucumber and capsicum from imported seed. A 2012 profile described it as highly profitable, with plans to expand to 20 acres.	The longest-running private proof point found
Aether (Islamabad)	CEO Zarak Khan. Builds turnkey hydroponic systems and sells its own “hyperlocal” produce. A 2022 profile reported 1,200–1,300 clients and about 45 acres of client farms.	Shows demand for hydroponic systems, not only produce
Sohail Ahmed (Karachi)	Built a vertical farm in a converted yarn factory in 2016. Sells leafy greens directly to restaurants and supermarkets.	Early proof of the restaurant and retail channel

Source: Express Tribune (2012); ProPakistani and VerticalFarmDaily (2022); Agritecture (2019); Arab News Pakistan (2024); HydroGrow Pakistan; PMAS-Arid Agriculture University. Operator profit, yield and payback claims are self-reported and left out.

PAKISTAN &COUNTING

LOCAL SUCCESS STORIES / 2

OPERATOR	WHAT THEY HAVE DONE	WHY IT MATTERS
Sulit Agro (Hyderabad)	Founder Attiq-ur-Rehman Bhayo. A 4,000 sq ft solar-powered indoor farm, registered 2022, first produce January 2024. Rs20M setup reported. About 100 kg of tomatoes since inception, per a 2024 profile.	A caution: indoor farming is capital-intensive and slow to ramp
HydroGrow Pakistan	Offers “Build-Operate-Train-Transfer”: it builds and runs the farm, trains the owner, then hands it over.	A route for landowners who lack the skills
Institute of Hydroponic Agriculture (Rawalpindi)	13.5 acres, 5 under automated greenhouses; activity since 2005; government-funded farmer training across Punjab.	A local training pipeline and knowledge base

Source: Express Tribune (2012); ProPakistani and VerticalFarmDaily (2022); Agritecture (2019); Arab News Pakistan (2024); HydroGrow Pakistan; PMAS-Arid Agriculture University. Operator profit, yield and payback claims are self-reported and left out. “First solar-powered vertical farm” is Sulit Agro’s own claim.

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THE INTERNATIONAL PRECEDENT: THE NETHERLANDS

Roughly the size of Maryland and about a thousand miles from the Arctic Circle, yet one of the world's biggest food exporters.

#2

Agricultural exporter by value

Second only to the US.

USD 140B+

Agricultural exports (2024)

~24,000

Acres of greenhouses

Concentrated in Westland.

3x

Research funding over three decades

Anchored by Wageningen University.

Up to 90%

Less water dependence for key crops

Since 2000, for specific crops and systems.

Near zero

Chemical pesticide use in greenhouses

The lesson for Pakistan is institutional: sustained research, local technical expertise and resource efficiency matter more than novelty.

Source: Washington Post (2022); What Is Missing; Countrywide Farmers.

Section 05

BUSINESS MODELS & ECONOMICS

Three tiers, from a low-tech polyhouse to a premium controlled environment, with costs, prices and payback

05

WHERE TO START: THE PRACTICAL ENTRY POINT

THE LOW-TECH POLYHOUSE

A locally built greenhouse frame, shade net or plastic covering, and simple hydroponic channels. It suits growers who want to test the technology at small commercial scale.

Leafy greens **Lettuce** **Spinach** **Herbs**

GROWING IS ONLY HALF THE BUSINESS

The bigger question is who will buy the produce. The strongest proposition is consistent, fresh produce for customers who value quality and reliability.

Hotels **Restaurants** **Cafes** **Caterers**

Modern retail

Source: Pakistan & Counting research dossier (October 2026).

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CHOOSING A SYSTEM

Most commercial systems are variations on a few ways of getting nutrient solution to the roots.

SYSTEM	HOW IT WORKS	TYPICAL FIT
NFT (nutrient film technique)	A thin film of nutrient-rich water flows through channels	Leafy greens, herbs
DWC (deep water culture)	Roots sit in nutrient solution, supported above a reservoir	Leafy greens
Drip	Nutrient solution is delivered through tubes to plants or media	Fruiting crops
Dutch / Bato bucket	Media-based individual containers	Tomatoes, peppers, other fruiting crops
Aeroponics	Roots hang in the air and are misted with nutrients	High-control and vertical farms

Source: FAO; University of Minnesota Extension; South Africa DAFF, Hydroponic Vegetable Production Guide (2011).

PLANNING ESTIMATE

PAKISTAN &COUNTING

THREE-TIER VALUE LADDER

Each tier is sized at about 1 kanal (5,400 sq ft). All figures are planning estimates from a working business-case framework.

TIER	WHAT YOU BUILD	SET-UP COST (CAPEX)
Tier 1 Low-Tech Polyhouse	Local bamboo or steel frame, shade net, manual NFT or DWC channels, basic generator	PKR 1.5M–2.5M
Tier 2 Mid-Scale Greenhouse	Stronger GI frame with pad-and-fan cooling, semi-automated dosing, hybrid solar	PKR 4.5M–7.0M
Tier 3 Premium Controlled Environment	Insulated glass or polycarbonate, full climate control and automation	PKR 12M–20M+

Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors. CapEx = one-time set-up cost.

SECTION 05 · TIER 1 PLANNING ESTIMATE

PAKISTAN &COUNTING

TIER 1: LOW-TECH POLYHOUSE — CAPEX

About 1 kanal (5,400 sq ft). The cheapest way to test hydroponics at small commercial scale.

TOTAL SET-UP COST

PKR 1.5M–2.5M

15–25 lakh

Land cost is not included.

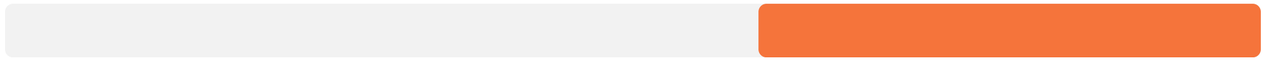
ITEM	WHAT YOU GET
Structure	Local bamboo or steel frame, shade net, basic poly-film
Growing system	Manual NFT or DWC channels using local PVC
Power backup	Basic manual generator

Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

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TIER 1: MONTHLY OPEX

OpEx is the running cost of the farm each month. Energy is the largest listed line.

Nutrients and media		**PKR 30K–50K**
Energy and power Falls to 30K–50K with hybrid solar (Tier 2)		**PKR 60K–100K**
Labour		**PKR 50K–70K**
Total of listed items	Scale: PKR 0–100K a month	**PKR 140K–220K**

Not included: rent, packaging, transport, seeds, maintenance, crop losses and financing.

Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

SECTION 05 · TIER 1 PLANNING ESTIMATE

PAKISTAN &COUNTING

TIER 1: WHAT IT COSTS, WHAT IT SELLS FOR

Focus crops: local lettuce, spinach and herbs.

Production cost Per kg		**PKR 120–160**
Wholesale price Per kg		**PKR 220–300**

35–45%

Gross margin

The share of the sale price left after production costs.

18–24 months

Payback

Time to earn back the set-up cost.

Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

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THREE QUESTIONS TO ANSWER BEFORE BUILDING

1

Who will buy it?

Hotel, restaurant, retailer or market, and on what payment terms?

2

At what price and volume?

What will you actually be paid per kilogram, week after week?

3

What happens to what does not sell?

Spoilage and rejection rates decide the margin.

Source: Pakistan & Counting working framework (October 2026).

SECTION 05 · TIER 2 PLANNING ESTIMATE

PAKISTAN &COUNTING

TIER 2: MID-SCALE GREENHOUSE

The step up: a stronger structure with cooling, semi-automated dosing and solar backup, growing higher-value crops. About 1 kanal.

STRUCTURE
GI (galvanised iron) frame, anti-drip UV plastic, pad-and-fan cooling

GROWING SYSTEM
Semi-automated NFT plus drip and dosing

POWER BACKUP
Hybrid solar, 5–10 kW

FOCUS CROPS
Butterhead lettuce, bell peppers

MONTHLY COSTS (PKR)

Nutrients and media	60K–90K
Energy and power	30K–50K
Labour	100K–150K
Total of listed items	**190K–290K**

SET-UP COST (CAPEX)
PKR 4.5M–7.0M

PKR 180–240
Production cost per kg

PKR 350–500
Wholesale price per kg

45–55%
Gross margin

24–36 mo
Payback

Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

SECTION 05 · TIER 3 PLANNING ESTIMATE

PAKISTAN &COUNTING

TIER 3: PREMIUM CONTROLLED SETUP

Full climate control and automation for the highest-value crops. About 1 kanal.

STRUCTURE
Insulated glass or polycarbonate, automated climate control and chillers

GROWING SYSTEM
Dutch bucket, NFT or aeroponics with automated dosing

POWER BACKUP
Industrial solar plus automated generator

FOCUS CROPS
Exotic greens, microgreens, strawberries, cherry tomatoes

MONTHLY COSTS (PKR)

Nutrients and media	120K–200K
Energy and power	100K–180K
Labour	250K–400K
Total of listed items	**470K–780K**

SET-UP COST (CAPEX)
PKR 12M–20M+

PKR 350–500
Production cost per kg

PKR 800–1,500
Wholesale price per kg

50–65%
Gross margin

36–48 mo
Payback

Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

PLANNING ESTIMATE

PAKISTAN &COUNTING

ALL THREE TIERS AT A GLANCE

	TIER 1	TIER 2	TIER 3
Build	Low-tech polyhouse	Mid-scale greenhouse	Premium controlled environment
Set-up cost (CapEx)	PKR 1.5M–2.5M	PKR 4.5M–7.0M	PKR 12M–20M+
Monthly cost (listed items)	PKR 140K–220K	PKR 190K–290K	PKR 470K–780K
Focus crops	Lettuce, spinach, herbs	Butterhead lettuce, bell peppers	Exotic greens, microgreens, strawberries, cherry tomatoes
Wholesale price	PKR 220–300/kg	PKR 350–500/kg	PKR 800–1,500/kg
Gross margin	About 35–45%	About 45–55%	About 50–65%
Payback	18–24 months	24–36 months	36–48 months

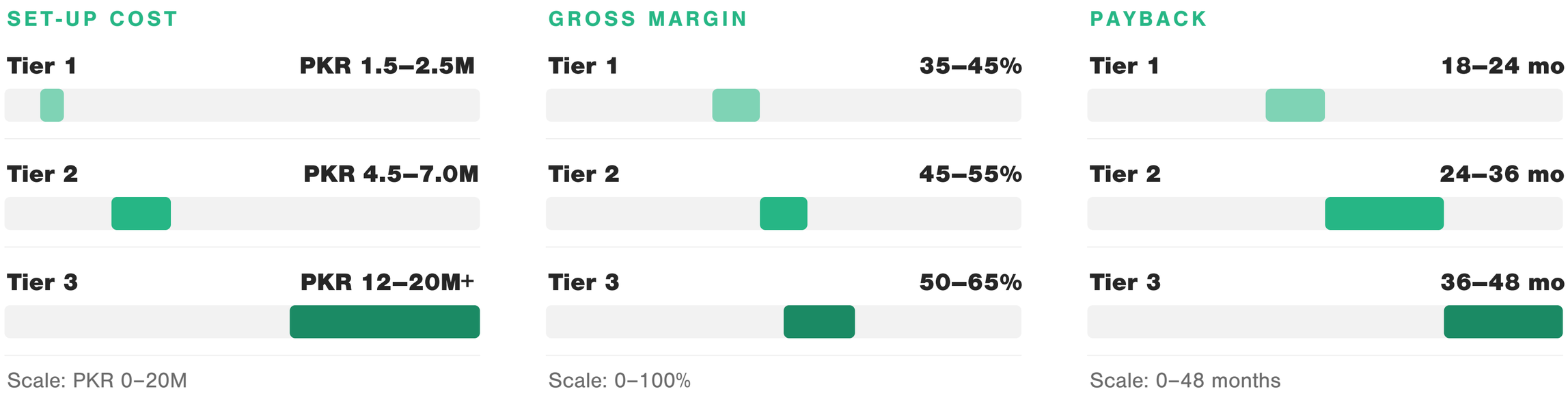
Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

PLANNING ESTIMATE

PAKISTAN &COUNTING

HIGHER TIERS COST MORE, EARN MORE AND PAY BACK SLOWER

Each bar shows the estimated range for that tier.



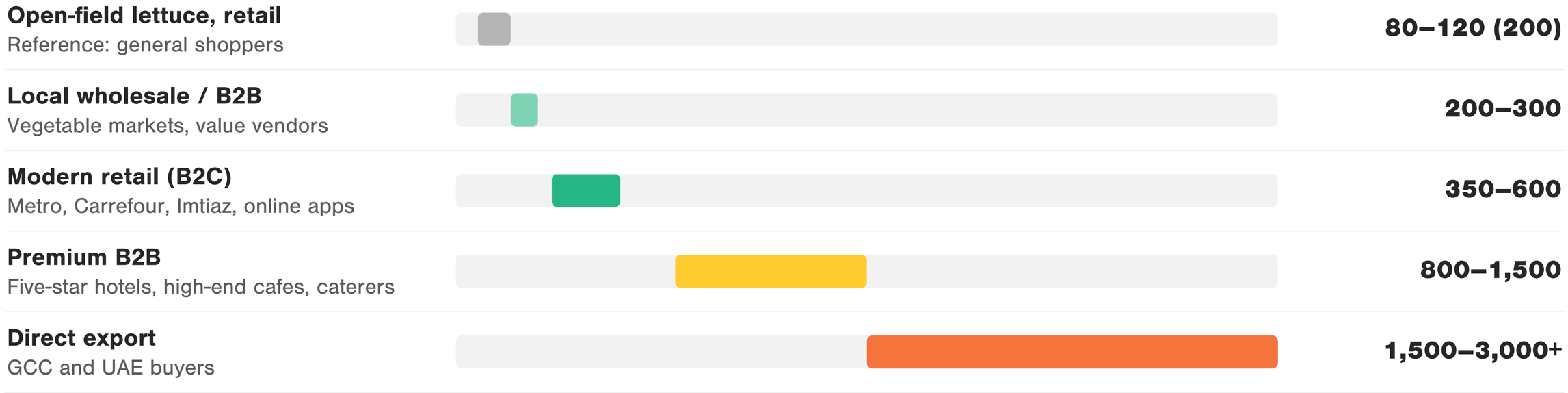
Source: Pakistan & Counting working framework (October 2026). Planning estimates, not yet confirmed by operators or vendors.

PLANNING ESTIMATE

PAKISTAN &COUNTING

THE PRICING LADDER: WHAT A KILO CAN SELL FOR

The same kilo of greens earns very different prices depending on who buys it.



PKR per kg, scale 0–3,000. Open-field lettuce reaches up to 200 at premium grocers.

Source: Pakistan & Counting working framework (October 2026); Fresh Basket; The Farmette. Illustrative prices, not verified transaction prices. Export needs its own compliance and economics check.

Section 06

CHALLENGES AND RISKS

What newcomers should know before they start

06

PAKISTAN &COUNTING

WHAT NEWCOMERS SHOULD KNOW BEFORE THEY START

RISK	WHY IT MATTERS
Power dependency	Pumps are critical in many systems, and indoor farms add lighting, cooling and dehumidification. Outages can cause crop loss. Not every system needs electricity, but commercial recirculating and indoor systems do.
Technical skill gap	pH, nutrient strength, flow, water quality and climate must be managed precisely. Small mistakes show up in the crop quickly.
Water quality	Salinity (salt), alkalinity and the chemistry of the source water can change crop performance.
Imported inputs	Seed, nutrients, media, sensors and spare parts may have to be imported.
Capital intensity	Structures, pumps, controls and backup power raise upfront cost.

Source: SDPI (2024); FAO; South Africa DAFF, Hydroponic Vegetable Production Guide (2011); ZeroSoilGardens, Hydroponic Gardening Made Easy (temperature ranges); Pakistan & Counting research dossier.

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WHAT NEWCOMERS SHOULD KNOW / 2

RISK	WHY IT MATTERS
Heat	Cool-season crops such as lettuce grow best at about 16–21°C, and the nutrient solution at about 18–24°C, so summer heat must be managed. The cost framework adds pad-and-fan cooling from Tier 2.
Market absorption	Premium demand is concentrated in cities. Overproduction leads to spoilage and pressure on margins.
Food safety	Warm, humid, nutrient-rich conditions favour salmonella and plant diseases such as damping-off. Hygiene and management matter.
Labour and management	A commercial unit needs labour seven days a week at peak season, and skills in production, labour, marketing and infrastructure at once.
Claims and positioning	Hydroponic produce is not organic, because artificial nutrients are always used. Say “pesticide-reduced” and “consistent”, not “organic”.

Source: SDPI (2024); FAO; South Africa DAFF, Hydroponic Vegetable Production Guide (2011); ZeroSoilGardens, Hydroponic Gardening Made Easy (temperature ranges); Pakistan & Counting research dossier.

Section 07

WHO SHOULD ENTER?

Six profiles that fit, and the one that does not

07

SECTION 07 · WHO SHOULD ENTER?

WHO SHOULD ENTER

Hydroponic farming is a business of daily management and selling, not only agriculture. It needs a market identified in advance and labour through the peak season.

PROFILE	WHY THIS FITS
Existing greenhouse and poly-tunnel growers	Already know protected horticulture; hydroponics is a natural extension
Peri-urban landowners with 1–5 acres	Can grow close to premium city customers
Progressive agri-entrepreneurs	Can combine farming, technology and B2B selling
Urban side-hustlers and small growers	The lowest-capital route (Tier 1) to test leafy-green demand locally
Well-capitalised agripreneurs and corporates	Can absorb infrastructure, backup power and market-building costs (Tiers 2–3)
Solar-integrated investors	Useful where power is the main operating risk

WEAKEST FIT Anyone who expects soil-farming skills to carry over without retraining, or who cannot fund the months it takes to build a customer base.

Source: Pakistan & Counting research dossier (October 2026); South Africa DAFF, Hydroponic Vegetable Production Guide (2011).

PAKISTAN &COUNTING

WHAT IT TAKES TO GROW WITH LESS WATER

01 Hydroponics is a USD 7–20B global market, depending on the research firm, growing roughly 10–13% a year

02 Pakistan is water-stressed: agriculture uses over 90% of freshwater, and water per person has fallen from about 5,600 m^3 to about 900 m^3

03 Hydroponics can use up to 90% less water, and Pakistan already has operators and a government institute to learn from

04 A low-tech one-kanal polyhouse is estimated at PKR 15–25 lakh, but finding premium buyers is the harder half

05 No single policy has unlocked it: power, skills and customers are the hurdles, and solar finance and institutional support are converging

Source: As cited throughout this deck. Tier costs are planning estimates.

Section 08

USEFUL RESOURCES

08

Forty sources across market research, water data, technical guides, operators and policy

USEFUL RESOURCES 1–14

GLOBAL MARKET

01 Mordor Intelligence — Hydroponics Market

02 Precedence Research — Hydroponics Market

03 360iResearch — Hydroponics

04 RootsAnalysis — Hydroponics Market

05 Research and Markets — Hydroponics Market Report 2026

06 TechSci Research via Research and Markets — Hydroponics Market

07 MarketsandMarkets — Hydroponic Market (background, different scope)

PAKISTAN WATER AND AGRICULTURE

08 Pakistan Economic Survey 2025-26 — Agriculture chapter

09 World Bank / FAO AQUASTAT — Agriculture share of freshwater withdrawals

10 APP — LCCI on water reservoirs (per-person water availability)

11 Dawn — Pakistan water-scarcity ranking (June 2026)

12 Profit by Pakistan Today — Pakistan ranked 14th most water-stressed

13 Pakistan Today — Indus Basin snow cover (April 2026)

HYDROPONICS: TECHNICAL

14 FAO — No soil, no problem (2026)

USEFUL RESOURCES 15–28

HYDROPONICS: TECHNICAL

15 FAO — Growing without soil: hydroponics fundamentals, pros and cons (2024)

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