



understanding
agriculture worldwide

www.agribenchmark.org/cash-crop



THÜNEN


Crop Portrait
RICE

by
agri benchmark



Rice Production Systems

One product – many ways
to produce around the world



Top 5 Countries Rice Production (milled)

(average 2017 – 2019, in metric tons)

- CHINA 148 Million
- INDIA 116 Million
- INDONESIA 35 Million
- BANGLADESH 34 Million
- VIETNAM 27 Million

CHINA

Typical Farm CN1SI

Specific location
Zigong, Sichuan province

Rice Acreage
0,3 hectares

Tillage
Intensive tillage (plough)

Rotation
annual cropping rotation
with double cropping

Harvest per year (2)
rice/winter rapeseed

Exchange rate (2019)
1 USD = 6,91 CNY

INDIA

Typical Farm IN3PB

Specific location
Punjab, North India

Rice Acreage
2,8 hectares

Tillage
Intensive tillage (plough)

Rotation
annual cropping rotation
with double cropping

Harvest per year (2)
rice/winter wheat

Exchange rate (2019)
1 USD = 70,37 INR

THAILAND

Typical Farm TH5CP

Specific location
Suphan Buri province

Rice Acreage
5,6 hectares

Tillage
Intensive tillage (plough)

Rotation
annual cropping rotation
with double cropping

Harvest per year (2)
dry season rice/
wet season rice

Exchange rate (2019)
1 USD = 31,05 THB

VIETNAM

Typical Farm VN2MRD

Specific location
An Giang province

Rice Acreage
2,0 hectares

Tillage
Intensive tillage (plough)

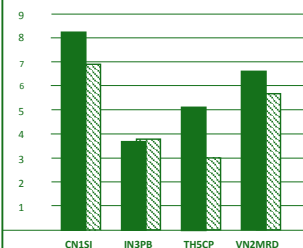
Rotation
annual cropping rotation
with three crops

Harvest per year (3)
summer rice/
dry season rice/autumn rice

Exchange rate (2019)
1 USD = 25,000 VND

Typical Farm Rice Yield

(metric ton per hectare)



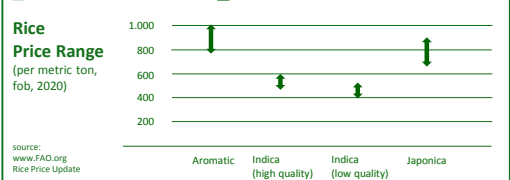
Country	Typical Farm Yield (t/ha)	National Yield (t/ha)
China (CN1SI)	~8.5	~7.0
India (IN3PB)	~4.0	~3.5
Thailand (TH5CP)	~5.0	~3.0
Vietnam (VN2MRD)	~6.5	~5.5

Cultivated Rice Varieties

Country	Variety	Type
China (CN1SI)	Liangyou No.1	two-line hybrid/indica
India (IN3PB)	PR126	non-basmati rice/indica
Thailand (TH5CP)	RD41	aromatic/hybrid
Vietnam (VN2MRD)	OM 5451	aromatic
	IR50404	long grain/indica

Rice Price Range

(per metric ton, feb, 2020)



source: www.FAO.org
Rice Price Update

Rice – Facts and Figures

Types of rice produced worldwide

Indica: long grain rice, produced in tropical and subtropical regions

Aromatic: Jasmine and Basmati rice, primarily produced in Thailand, Vietnam, Cambodia, India and Pakistan

Japonica: short and medium grain rice, produced in regions with moderate climates

Specialities: glutinous and other speciality rices, produced in Southeast Asia

Hybrid rice area

In China, hybrid rice is estimated to be planted on more than 50% of rice-growing land and it is credited with helping the country increase its rice yields, which are among the highest within Asia.

Hybrid rice is also grown in many other important rice producing countries including Indonesia, Vietnam, Myanmar, Bangladesh, India, Sri Lanka, Brazil, USA, and the Philippines.

Rice and climate change

Due to the flooding irrigation paddy rice production is a major source of greenhouse gas (GHG) emissions globally. According to FAO, it accounts for about 10% of all GHG emission from agriculture.

One option to reduce emissions is the so-called "Alternate Wetting and Drying Approach" developed by IRRI and others. The key idea: instead of flooding fields continuously, they get flooded in intervals of up to 10 days.

The main advantage: water use goes down by up to 30% and methane emissions can be reduced by about 45%. However, nitrous oxide emissions go up, hence a careful nutrient management is required.

Top Exporters

(in 1000 metric tons)

	2018	2019	2020
India	11.791	9.800	14.560
Thailand	11.056	7.560	5.706
Vietnam	6.590	6.580	6.167
Pakistan	3.913	4.600	3.900
USA	2.780	3.135	2.865

Top Importers

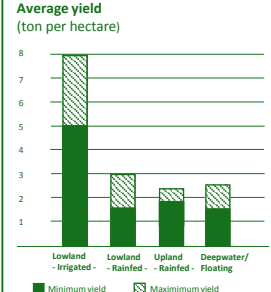
(in 1000 metric tons)

	2018	2019	2020
Philippines	2.500	2.900	2.450
China	4.500	2.600	3.200
EU	1.922	2.159	2.409
Nigeria	2.100	1.800	1.600
Saudi Arabia	1.290	1.425	1.630

Different Rice Ecosystems

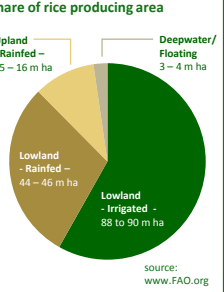
Average yield

(ton per hectare)



Ecosystem	Minimum Yield (t/ha)	Maximum Yield (t/ha)
Lowland - Irrigated	~5.0	~8.0
Lowland - Rainfed	~2.0	~3.0
Upland	~2.0	~2.5
Deepwater/Floating	~2.0	~2.5

Share of rice producing area



source: www.FAO.org

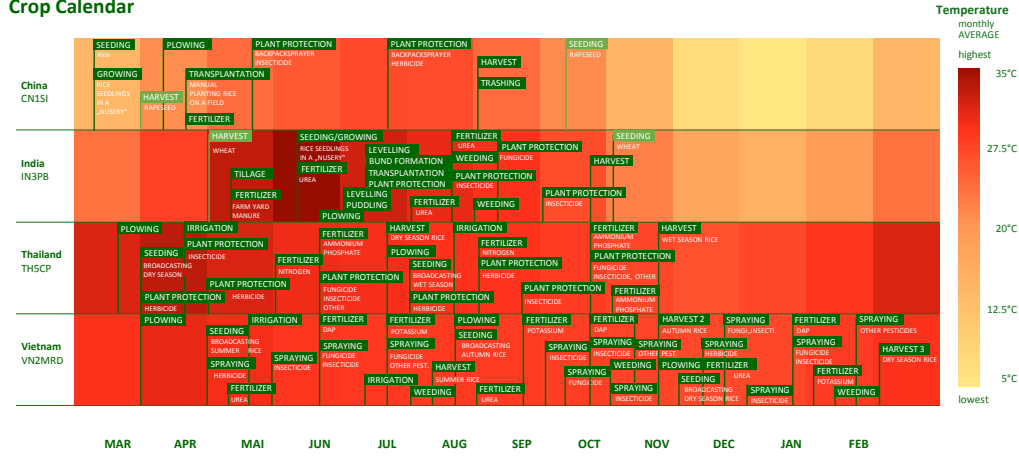
Irrigated - Grown in banded fields with assured water supply for one or more crops per year benefiting much from high-yielding and hybrid rice varieties. Farmers use more production inputs to increase rice yield.

Lowland - Rainfed - Bunds and dikes are built around rainfed lowland fields to capture and conserve rainfall for growth and development of rice plants; risk of crop failure is high.

Upland - Rainfed - In tropical climate areas on flat land or on slopes of hills and mountains, not surrounded by bunds or dikes; drought stress affects rice yield and production.

Deepwater/ Floating In low lying areas in deltas, estuaries, swamps, and rivers' valleys in tropical Asia and sub-Saharan Africa; rice fields are inundated for a considerable periods of time.

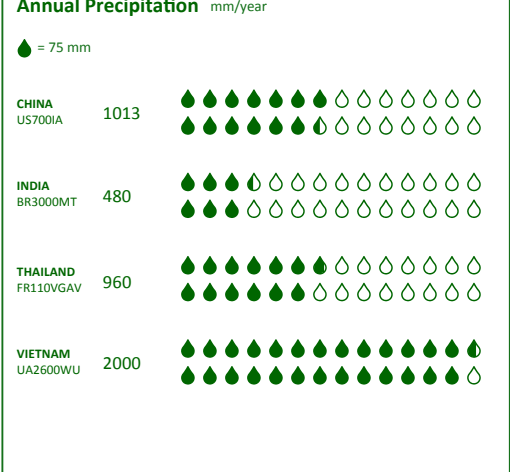
Crop Calendar



Annual Precipitation

mm/year

75 mm



Field Operations in Rice

source: www.knowledgebank.irri.org

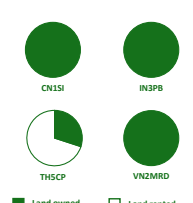
Operation	Activity	Notes
Preparing the Land	TILLAGE	aerate the soil, rid weeds and incorporate residuals
	LEVELLING	minimize water wastage and ensure equal water coverage on the field
Planting	TRANSPLANTING	seedlings are raised in a nursery transplanting seedlings at 15–21 days old to the field.
	DIRECT SEEDING	broadcasting by hand OR drilling with a seeder
Water Management	FLOODING	3 cm initially, gradually increase to 5 – 10 cm draining 7-10 days before harvesting
	MANUAL WC	not suitable for large areas
Weed Control	MECHANICAL WC	appropriate for crops transplanted in straight rows; use rotary or push weeder
	HERBICIDES	often applied with knapsack or hand sprayer
Fertilization	NITROGEN	approx. 16 kg N per kg rice harvested
	PHOSPHORES	approx. 5 kg P205 per kg rice harvested
	POTASSIUM	approx. 7 kg K2O per kg rice harvested
Harvesting	MANUAL H.	sickles, knives, threshing racks, simple treadle threshers, and animals for trampling
	MANUAL H. +	harvesting by hand; uses portable thresher or small stationary machine threshers
	MECHANICAL H.	uses a reaper, threshing by a thresher, and cleaning either manually or by machine
	COMBINE H.	combines all processes: reaping, threshing, and cleaning

Land Prices and Rental Rates

USD/ha

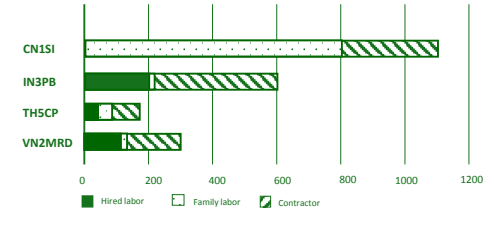
Country	Purchase price	Rental rate
China (CN1SI) (2016)	no land market	1.242
India (IN3PB) (2018)	61.566	1.956
Thailand (TH5CP) (2018)	58.024	196
Vietnam (VN2MRD) (2016)	23.650	1.290

Ownership Structure



Labor Cost

USD/ha



Direct Costs

USD/ha, 2019

Country	Cost (USD/ha)
CHINA (CN1SI)	419
INDIA (IM3PB)	123
THAILAND (TH5CP)	268
VIETNAM (VN2MRD)	401

