Rice

CC-7
UNIT-2

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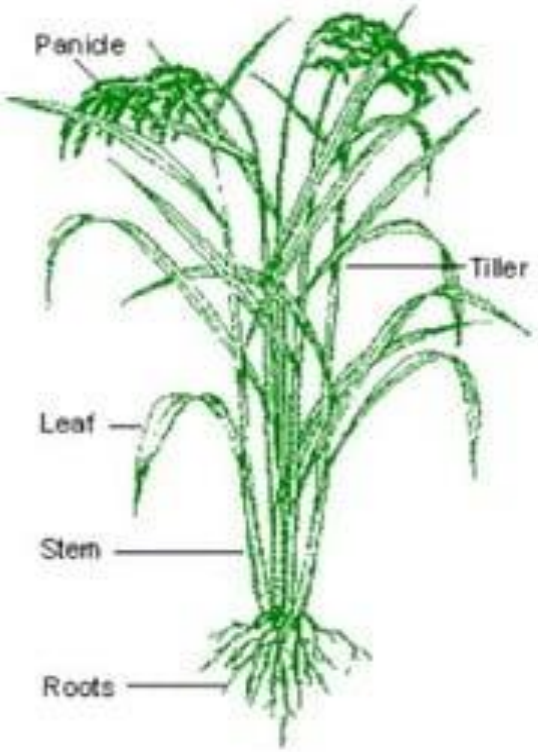
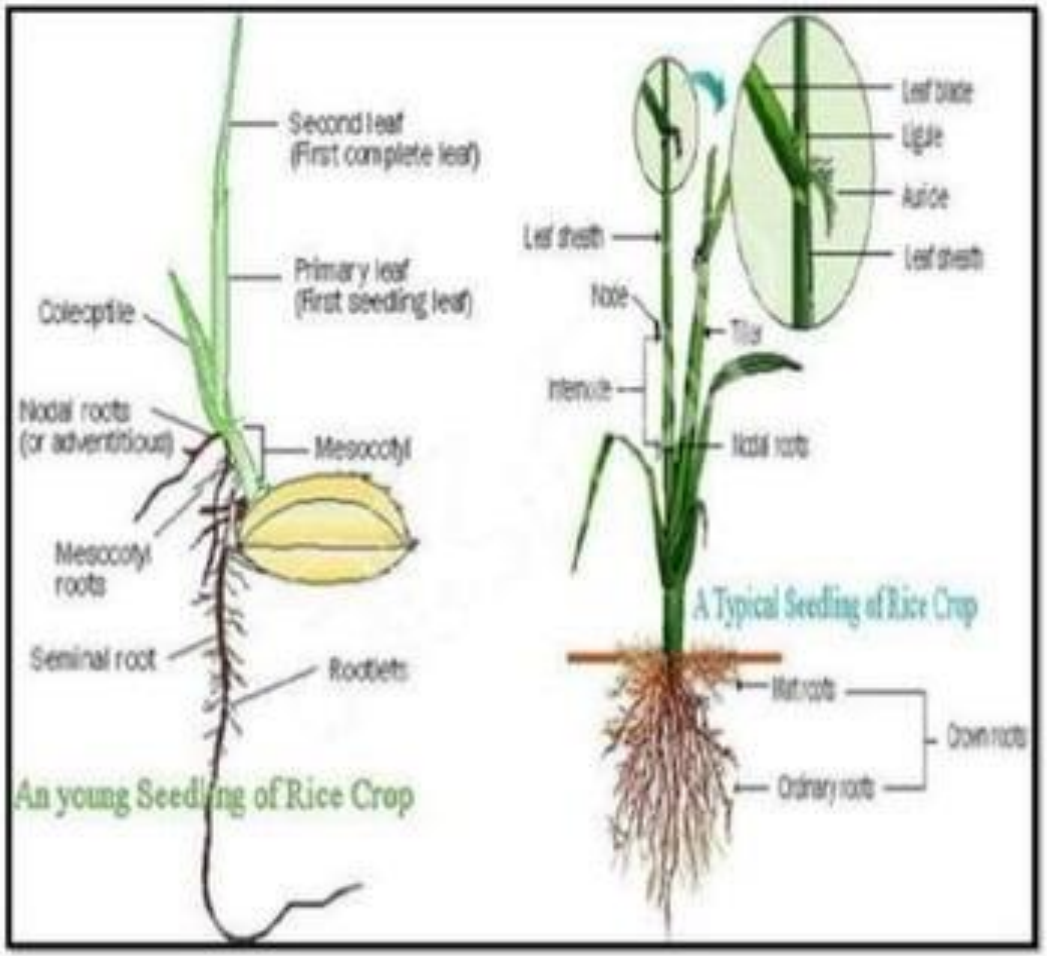
ORIGIN

- While many cultivated varieties of rice in West Africa belong to *Oryza glaberrima*, all rice varieties in Asia, Europe, and America are classified as *Oryza sativa* (2n=24).
- Given the range of cultivated variants found in south and southeast tropical Asia, *O. sativa* most likely evolved there (originating in India and Indo-China about 13–15,000 years ago).
- *O. sativa* var. fatua is a common wild rice found in Indian rice fields that is thought to be the direct ancestor of cultivated rice.

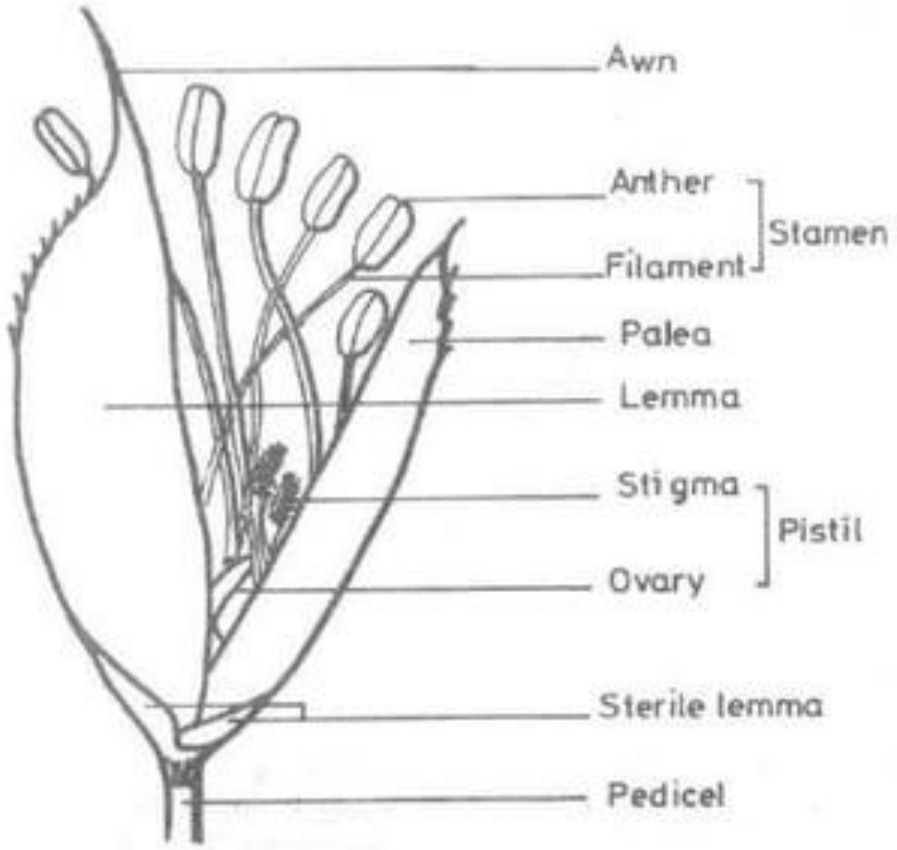
Morphology



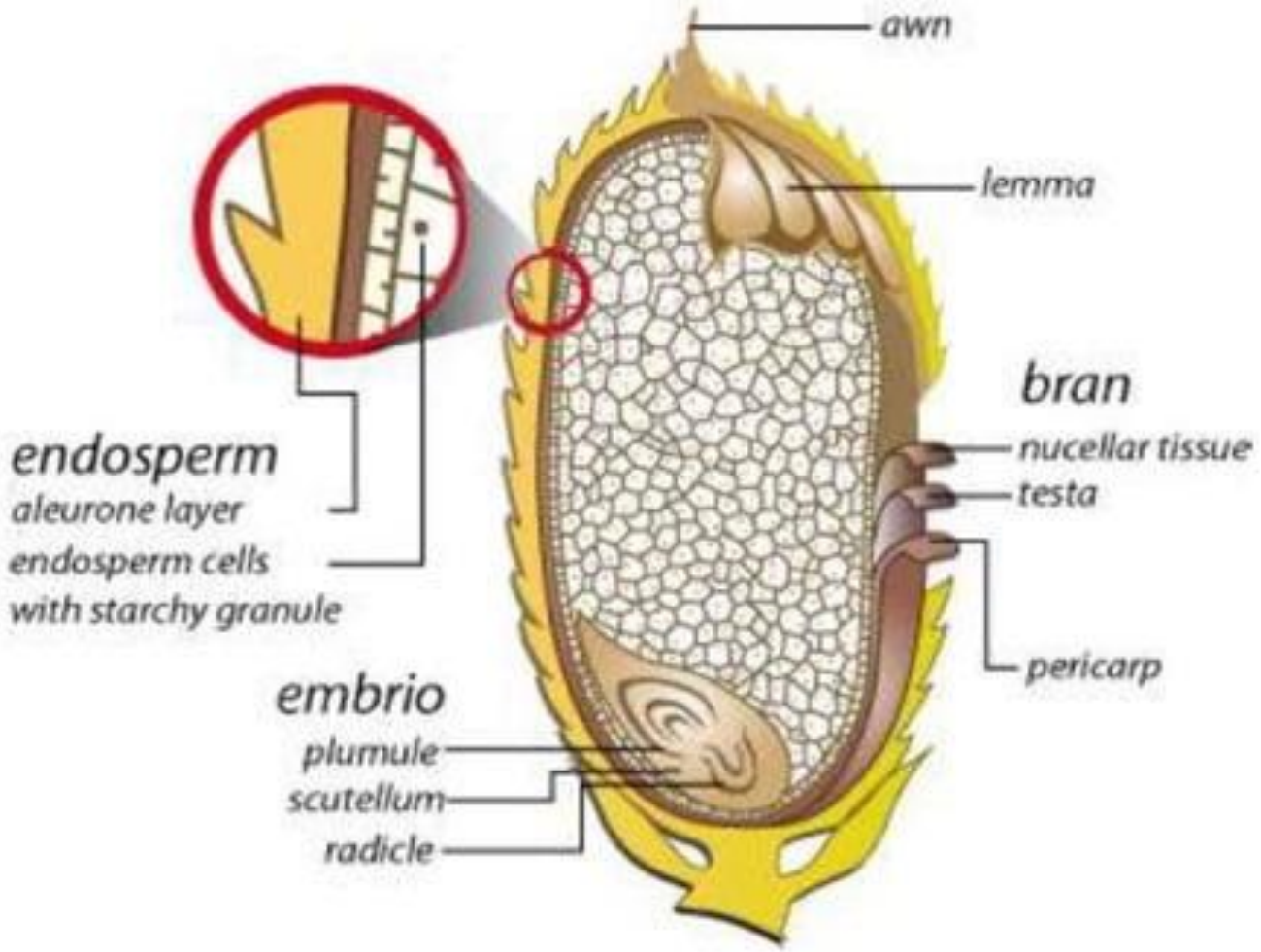
Botanical name :
Oryza sativa L.
Family: Poaceae



Spikelet- part of inflorescence (panicle)



Rice grain


awn
lemma
bran
nucellar tissue
testa
pericarp
endosperm
aleurone layer
endosperm cells
with starchy granule
embrio
plumule
scutellum
radicle

A member of the Poaceae (Gramineae) family is the rice plant. Commonly grown as an annual, rice plants can reach heights of two or three metres, while some kinds can reach heights of six to nine metres.

Root system: The sheath, or coleorhizae, appears when a rice grain germinates in well-drained highland soil. When it germinates in lowlands that are submerged, coleoptile appears before coleorhizae. Soon after it arises, the primary, embryonic roots (radicle) emerge through the coleorhiza. Two or more secondary roots, each of which develops lateral roots, come next. Later on, the embryonic roots die and are replaced by secondary adventitious roots that grow from the culm's subterranean nodes. Take aim and shoot.

Shoot System: discernible from above. made up of leaves, culms, and inflorescences (panicle).

i. Culm: A network of internodes and nodes makes up the culm, also known as the stem. Rice culms are typically hollow, with the exception of the nodes. Every node has a bud and a leaf. When conditions are right, buds that are close to the ground develop into tillers. Primary tillers produce secondary tillers, and secondary tillers produce tertiary tillers. ii. Leaves: The rice plant has sessile leaves. They are carried at an angle, one at each node, in two ranks on the culm along the stem. The leaf sheath fastens the leaf blade to the node. Although the rice leaf and wheat leaf are similar, the rice leaf can be identified from wheat by its longer ligule. The ligule in rice is highly noticeable and typically measures more than one centimetre. A primary tiller has more leaves than a secondary or tertiary tiller.

iii. Panicle: A cluster of spikelets carried on the highest node of the culm is referred to as a panicle in rice inflorescence. There are secondary and occasionally tertiary branches that split off from the main panicle branch. These bear the spikelet.

iv. Spikelet: Each spikelet is made up of two external glumes. A floret is any portion that is located above the outer glumes as a whole. The entire flower is situated between the two segments of the hard covering, referred to as the lemma and palea (the glumes). The term "hull" refers to the combination of the lemma and palea.

The rice flower has a pistil, which is a female organ, and six stamens, which are male organs. The two transparent structures at the base of the bloom are called 'lodicules'. A crop that self-pollinates is rice.

The stamens emerge outside the open floret when the rice flower is ready to bloom because the lodicules become turgid and push the lemma and palea apart. Pollen grains are then released when the anthers rupture. Lemma and palea close after pollen grains land on stigma.

V. **Grain (Caryopsis):** Following the completion of fertilisation and pollination, rice grain begins to mature. The lemma and palea firmly envelop the grain. Since its pericarp is brownish, the dehulled rice grain is referred to as brown rice. When rice is ground and polished, the pericarp—the outermost coat that encases the caryopsis—is removed. Beside the lemma on the ventral side of the spikelet is where the embryo is located. The hilum, a structure resembling a dot, is located next to the embryo. The radicle and plumule are found in the embryo. Coleoptile and coleorrhiza are the sheaths that enclose the plumule and radicle, respectively.

PROCESSING

Harvesting: When the plant's moisture content is between 20 and 25 percent, the paddy is harvested. It is then chopped with sickles and allowed to dry on the field for a few days.

Threshing: either by tramping with bullocks or, after about a week, by smashing the plants against wooden logs; mechanised threshers are also available.

Winnowing: Using a winnower or by hand, grain and chaff are separated.

After being cleaned, the resulting rough rice, paddy, or grain is sun-dried on a concrete surface. The process of shelling or hulling involves removing the husk or hull that encloses the kernel. Paddy is often hulled using a large mortar and pestle that can be operated by hand, foot, or water power.

Destoning: A destoner removes the dust and stones.

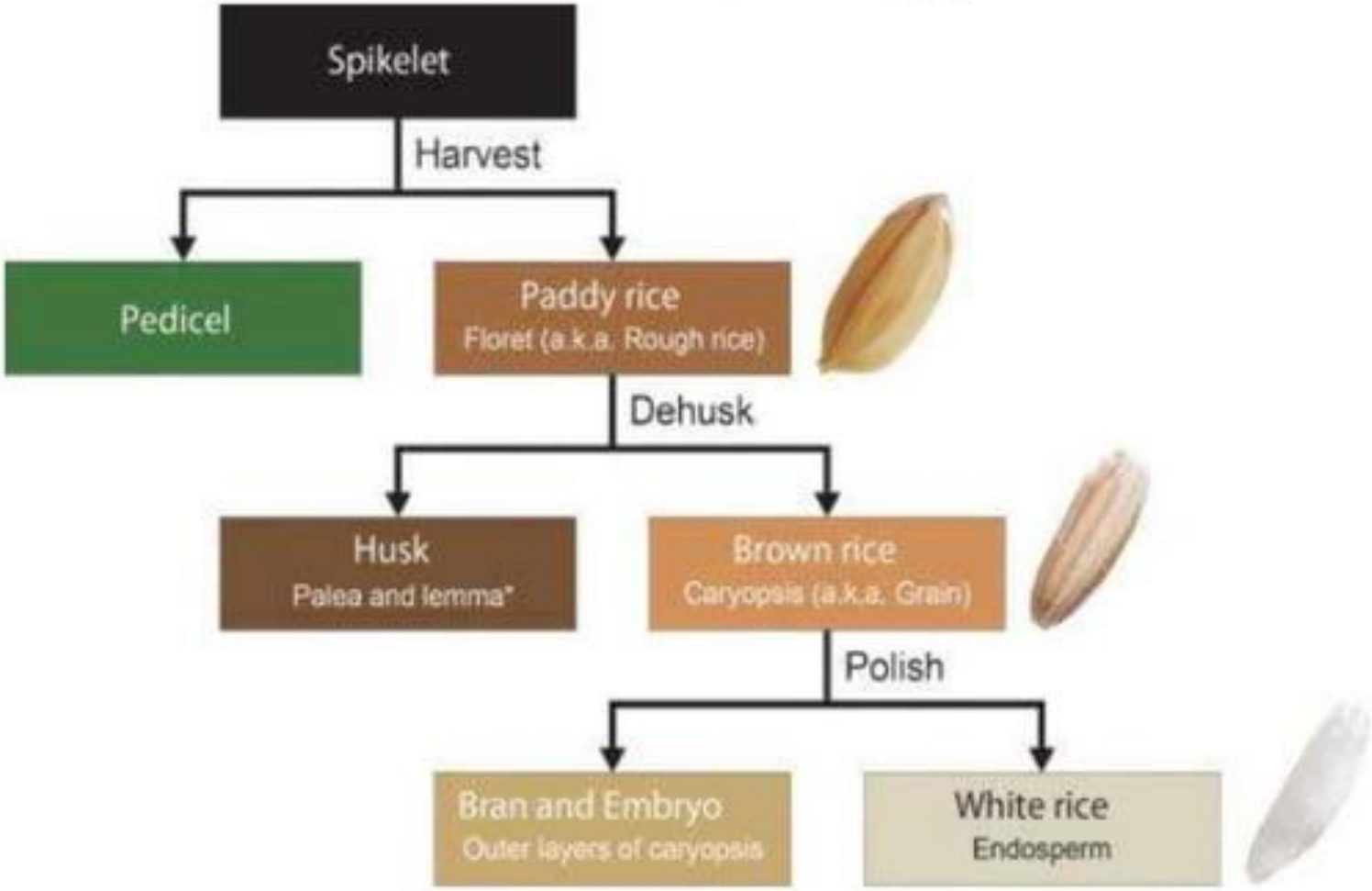
During milling, the husk is broken apart by passing the paddy between mill stones; blowers are used to remove the chaff.

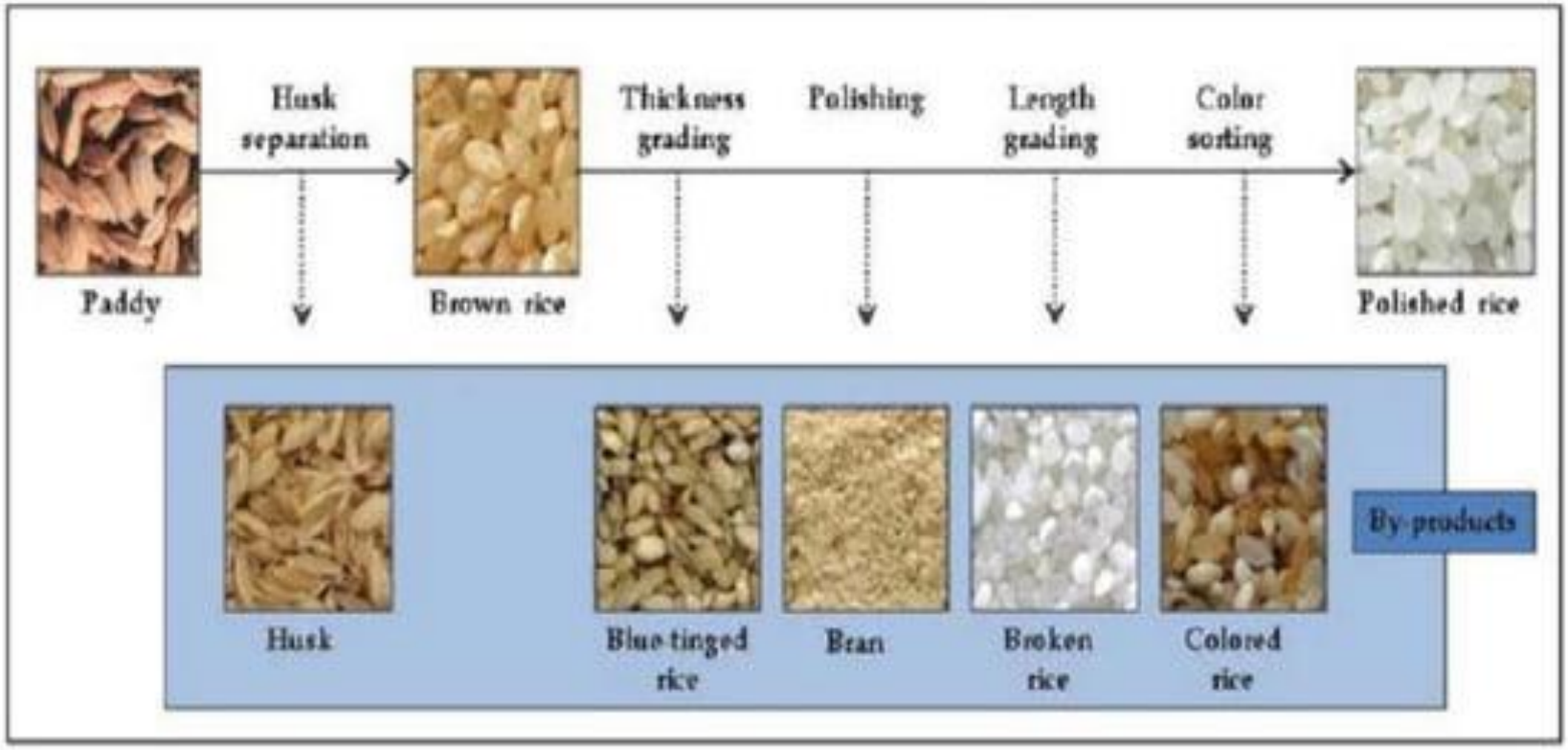
About 74% of the paddy is used to produce rice and its byproducts.

White rice is less nutritious than brown rice because brown rice has several thin coats that are rich in vitamins, minerals, and phytonutrients, which are removed during milling.

Polishing is the process of making white rice shiny and smooth by running it through a machine with a brush.

Processing


Spikelet
Harvest
Pedicel
Paddy rice
Floret (a.k.a. Rough rice)
Dehusk
Husk
Palea and lemma*
Brown rice
Caryopsis (a.k.a. Grain)
Polish
Bran and Embryo
Outer layers of caryopsis
White rice
Endosperm


Paddy
Husk separation
Brown rice
Thickness grading
Polishing
Length grading
Color sorting
Polished rice
Husk
Blue-tinged rice
Bran
Broken rice
Colored rice
By-products

USES

Over 60% of the world's population depends on rice as a main food crop. The USDA estimates that about 430 million metric tonnes of rice were consumed globally in 2008.

Products that are ready to eat are made, such as fermented goods, instant or rice flakes, canned rice, and popped and puffed rice.

In the cottage industry, rice straw is utilised for making straw boards, hats, mats, ropes, sound-absorbing materials, and cow feed. It is also utilised as thatching material for roofs.

Rice husk is utilised as fuel, animal feed, and in the production of paper.

Defatted bran from rice, which is high in protein, can be used to make biscuits or as cow feed. Rice bran is also utilised in the feed for poultry and cattle.

The soap industry uses rice bran oil. Like cotton seed oil or maize oil, refined oil can be utilised as a cooling medium. Industries use rice bran wax, a byproduct of rice bran oil.

Alcoholic products are brewed and distilled using broken rice.

Thank You