12

Steps

for

Successful

Rice

Production

STEP

10:

Store

Safely

Rice

is

best

stored

as

paddy

because

the

husk

provides

some

protection

against

insects

and

helps

prevent

grain

quality

deterioration.

A

safe

storage

system

will

prevent

the

grain

getting

wet

after

drying

and

also

give

protection

from

insects,

rodents

and

birds.

Rice

can

be

stored

for

longer

periods

if:



Moisture

is

maintained

at

less

than

14%

for

grain

and

12%

for

seed.



Grain

is

protected

from

insects,

rodents

and

birds



Grain

is

protected

from

re

‐

wetting

by

rain

or

from

the

surrounding

air.

A

rule

of

thumb

for

seed

is

that

the

life

of

the

seed

will

be

halved

for

every

1%

increase

in

moisture

content

or

a

5

o

C

increase

in

storage

temperature

above

recommended

levels.

Rice

Storage

systems

Bag

storage

system



Bags

should

not

be

stacked

higher

than

4m.



Bags

should

be

stacked

under

a

roof,

in

a

shed

or

under

water

proof

tarpaulins



A

one

meter

gap

should

be

left

between

and

around

stacks



Bags

should

be

stacked

on

pallets

or

above

ground



Bags

should

be

stacked

so

that

fumigation

can

be

undertaken

if

necessary.

Bulk

storage

Grain

can

be

stored

in

bulk

in

containers

made

from

wood,

metal

or

concrete,

located

under

or

inside

the

house.

While

these

storages

vary

in

size

they

all

need

to

be

protected

from

insects,

rodents,

birds

attack

as

well

as

moisture

uptake

Hermetic

Sealed

storage

Sealed

or

hermetic

storage

systems

are

a

very

effective

means

of

controlling

grain

moisture

content

and

insect

activity

for

seed

or

grain

stored

in

tropical

regions.

Sealed

storage

containers

come

in

all

shapes

and

sizes.

They

may

range

from

a

50kg

super

bag,

a

small

25

l

plastic

containers,

200

‐

litre

oil

drum

to

the

more

costly

sealed

large

plastic

commercial

storage

units

from

1

‐

300

tons.



12

Steps

for

Successful

Rice

Production

STEP

11:

Mill

Efficiently

Milling

rice

paddy

removes

the

husk

and

bran

layer

to

produce

white

rice.

Rice

is

best

milled

at

13

‐

14%

moisture

and

the

best

results

are

attained

when

the

process

is

completed

in

a

number

of

stage

and

grain

temperatures

do

not

exceed

45C

during

the

process.

An

efficient

mill

will

remove

the

husk

(20%),

the

bran

or

meal

(8

‐

10%)

and

leave

70%

as

white

rice.

Rice

grown

in

irrigated

systems

should

attain

60%

white

rice

as

head

rice

(unbroken

white

kernels)

and

rain

fed

systems

40

‐

50%

as

head

rice.

There

are

a

number

of

different

types

of

rice

mills

and

processing

being

used.

These

include:

1.

Hand

pounding

using

a

mortar

with

a

pestle

results

in

very

high

number

of

broken

rice

and

leaves

brown

rice

(meal

layer

still

attached).

Cleaning

of

the

husk

is

done

by

winnowing

2.

A

one

step

milling

process

where

the

husk

and

the

bran

are

removed

in

one

pass

and

white

rice

is

produced

directly

from

the

paddy.

The

single

pass

rice

mill

is

an

adaptation

of

the

ʺ

Engleberg

ʺ

coffee

huller.

This

process

results

in

many

broken

kernels,

low

white

rice

recovery

of

50

‐

55%

and

head

rice

yields

less

than

30%.

The

fine

brokens

are

often

mixed

in

with

the

bran

and

the

ground

rice

husk.

3.

A

two

‐

step

process

where

the

husk

and

the

bran

are

removed

separately.

These

mills

are

often

called

compact

rice

mills

and

in

many

countries

have

superseded

the

Engleberg

mill.

The

two

‐

stage

mill

has

separate

hulling

and

the

polishing

processes.

Rubber

rollers

remove

the

husk

and

the

brown

rice

is

then

polished

with

a

steel

friction

whitener.

These

mills

have

a

capacity

of

0.5

to

1

ton

per

hour

paddy

input

and

are

often

used

for

custom

milling

in

the

rural

areas.

The

milling

performance

of

the

compact

rice

mill

is

superior

to

the

single

pass

huller

with

milling

recoveries

normally

above

60%.

4.

A

multi

‐

stage

process

where

rice

passes

through

a

number

of

different

operations

and

machines

from

paddy

to

white

rice.

The

milling

process

in

larger

commercial

mills

combines

a

number

of

operations

that

produces

higher

quality

and

higher

yields

of

white

rice

from

paddy

rice.

The

process

involves:



Pre

‐

cleaning

the

paddy

prior

to

milling



Removing

the

husk

or

outer

layer

from

the

paddy



Polishing

or

whiting

the

brown

rice

to

remove

the

bran

layer



Separating

the

broken

grains

from

the

whole

kernels



Bagging

the

milled

rice



Managing

the

by

products

“

Poor

grain

quality

into

the

mill

means

poor

quality

rice

out”



12

Steps

for

Successful

Rice

Production

STEP

12:

Understand

the

market

The

value

of

milled

rice

in

the

market

is

determined

by

a

number

of

physical

and

chemical

characteristics

which

is

determined

by

the

consumer

and

will

vary

within

and

between

countries.

Physical

characteristics

Milling

degree

or

color.

The

degree

of

milling

or

amount

of

the

brown

rice

removed

affects

the

color

of

white

rice

and

often

the

price.

Under

milled

rice

absorbs

water

poorly

and

does

not

cook

well

and

is

normally

cheaper.

Head

rice

percentage

or

%

brokens

.

Head

rice

(whole

kernels)

also

includes

broken

kernels

that

are

75

‐

80%

of

the

whole

kernel.

High

head

rice

yield

is

one

of

the

most

important

criteria

for

measuring

milled

rice

quality.

High

quality

rice

normally

has

less

than

5%

brokens.

Whiteness

or

translucency.

This

characteristic

is

a

combination

of

varietal

physical

characteristics

and

the

degree

of

milling.

During

milling,

the

whitening

and

polishing

greatly

affect

the

whiteness

of

the

grain

and

its

transparency

Chalkiness.

Grain

appearance

is

affected

by

the

amount

of

chalkiness

or

white

belly.

Chalkiness

is

caused

by

interruption

of

final

filling

of

the

grain.

Though

chalkiness

disappears

upon

cooking

and

has

no

direct

effect

on

cooking

and

eating

qualities,

excessive

chalkiness

often

downgrades

the

quality

and

reduces

milling

recovery.

Chemical

characteristics

Gelatinization

temperature

or

cooking

time.

Environmental

conditions,

such

as

temperature

during

ripening,

influence

gelatinization

temperature.

There

is

normally

a

preference

for

rice

with

intermediate

gelatinization

temperature.

Amylose

contentor

stickiness.

The

amylose

content

of

rice

usually

ranges

from

15

to

35%.

High

amylose

ricehas

high

volume

expansion

and

grains

cook

dry,

are

less

tender

and

become

hard

upon

cooling.

Low

‐

amylose

rice

cooks

moist

and

sticky.

Intermediate

amylose

rice

(21

‐

24%)is

preferred

in

most

rice

‐

growing

areas

of

the

world.

Gel

consistency

measures

the

tendency

of

the

cooked

rice

to

harden

on

cooling.

Varieties

with

a

softer

gel

consistency

are

preferred

if

consumed

after

cooling,

and

the

cooked

rice

has

a

higher

degree

of

tenderness.

“Eating

quality

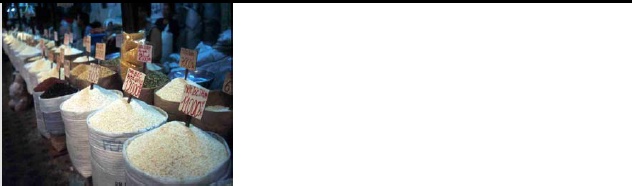
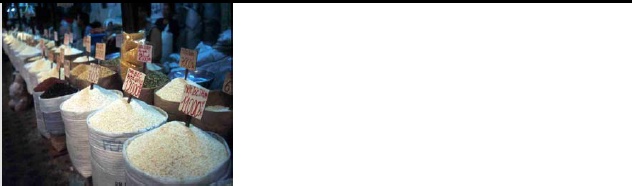
is

determined

by

the

consumer”



**Activity (3)**

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