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THE INDONESIAN SEEDS INDUSTRY PROJECT 1/

by

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Preface

Although seed processing may not be a typical example of the agro-industrial business, it is a very important part of agriculture which calls for a good deal of technological know-how. Good-quality seed is one of the prerequisites for higher crop yields of an improved quality, which increase the income of the farmers and enable the agro-industrial industry to manufacture better products.

The Indonesian Seeds Industry project started in 1971. In the near future, production of rice seed, the yearly potential consumption of which will be abt. 18,000 tons in 1980, will be emphasized. The Sukamandi Seed Farm will produce 11,000 tons in a highly mechanised operation. The storage and processing plant will have a capacity to dry 200 tons of seed per day, to store 6,400 tons per season and to process and package it at 6 and 10 tons per hour respectively. Because rice is a transplanted crop and the holdings of the farmers are small, the seed has to be packaged in bags of 3, 5 and 10 kg respectively. Distribution will take place via a fertilizer sales organization.

A team of ILACO/CEBECO consultants is engaged in marketing studies, the management of farm operations, the design and management of the processing plant, and in the training of Indonesian staff and personnel who are to take over the management in the near future.

Introduction

After some years of study by the Government of Indonesia, a team of Consultants, F.A.O. and I.B.R.D., the Government of Indonesia decided to implement a Seeds Industry Development Project in 1971.

The project was initiated because the quantity and quality of the variety-oriented seed supply stream had proved inadequate to meet the growing demand, especially for rice. Upgrading the existing rice seed production system was considered to be impossible and a new seed stream based on centralized production and modern seed technology would have to replace it. A modern breeding and research station, a section for control and certification of seed and proper legislation of seeds were also deemed necessary.

The project

The project called for:

- establishment of a National Seeds Corporation (N.S.C.) which would be responsible for production, processing and marketing;
- setting up of a 250 ha research branch to ensure an adequate flow of high-yielding plant varieties to support the seed production programme;
- enactment of appropriate seeds legislation and establishment of a small Government organization to administer the law and to be responsible for seed certification, later on;
- development of staff and farmers' training facilities.

Seed consumption potential

The rice seed consumption potential had been calculated in the preliminary studies. A detailed survey was made in 1972 and updated in 1973. The consumption of seed of high-yielding varieties is expected to grow to 18,000 tons in 1980. The market share of the National Seeds Corporation has been estimated at 60%, or abt. 11,000 tons.
The seed demand for soy-beans, maize and groundnuts was studied in the second part of 1973; the total demand for quality seed in 1980 has been estimated at 4,700, 7,700 and 3,300 tons per annum respectively.

Rice being the most important food crop in Indonesia, the emphasis will be on rice seed production in the near future. Experiments on other crops for seed production will be undertaken so that they can be grown, if and when necessary.

The National Seeds Corporation

To implement the project and the new policy, a National Seeds Corporation was established. All of its activities are to be related to seeds. The Corporation is allowed to produce and to market certified seeds only. Being a Government enterprise, it has to work along the principles of business-economics.
Large-scale production and processing will take place on the Sukamandi Seed Farm, a big estate in West Java. Experimental work will be undertaken near Klaten, Central Java, where the seed will be produced under contract-growing by small holders; here only processing and storage are handled by the Corporation.

The Sukamandi Seed Farm

This estate is situated on the North Coast of West Java, abt. 120 km East of Jakarta. It is a former sisal estate of approx. 4,500 ha, of which abt. 2,500 ha are intended for mechanised rice growing.
The climate is tropical with a six-month dry season from May to October, in which the monthly rainfall averages less than 60 mm. The rainy season is from November to April. The total annual rainfall is abt. 1,500 mm on average. The clay soil is well suited to rice growing. Irrigation water is available from the Jatiluhur storage dam throughout the year.

The production capacity has been based on growing two crops a year at a cropping intensity of 140%. Doublecropping with rice at a 200% cropping intensity is not feasible because of the need for fallowing between changing varieties or for cleaning the fields from drop seed. The yields are expected to be 4,000 kg/ha, of which 3,200 kg will be clean seed. The total production of rice seed will be 11,000 tons annually.

Because of the size of the enterprise and the limited amount of labour available during the harvest and planting times, most of the field operations have been mechanised. The fields are prepared by crawler tractors and offset disc harrows; subsequently, puddling takes place with open rollers. The directly seeded crop is to be harvested with 14-ft combine harvesters on tracks. The grain handling is in bulk, transport to the processing plant takes place by wheel-tractors and 5-ton tipping trailers.

The Seed Processing Plant

The plant consists of:

	capacity:
- intake, precleaning and drying section *)	80 tons/hr. 200 tons/day
- bulk storage	6400 tons
- processing machinery	6 tons/hr.
- packaging line	10 tons/hr.
- warehouse for packed seeds	4 - 5tons on pallets

*) from 20 to 12% moisture content

The above capacities have been based on two harvest periods of abt.35 days each; processing will be done during two periods of 100 days. Four to six varieties will be grown.

Operations

The combine-harvested seed will be received in bulk. The moisture content during harvest varies from 18-22%, for safe storage the seed has to be dried down to a moisture content of 12%.
From the intake-pit, the paddy is brought via a conveying and elevating system to the pre-cleaner, which removes coarse roughage, light materials and weed seeds. After precleaning, the paddy is weighed and automatically sampled. The discards from the precleaner are led off to be disposed of. The cleaned paddy is led to the dryers.
The two circulating continuous dryers can each handle batches of 20 tons. A fan/heater unit with automatic burner control provides the heated air for drying. To prevent damage to the seed, its temperature should not exceed 40°C if it has a moisture content over 14°C, and 44°C if its moisture content is below 14°C.

After drying to a moisture content of less than 12%, the seed is again led into the precleaner and scale to remove dust and light materials and to assess the exact weight to be put into storage.
The siloblock consists of 8 rows of 10 bins each, 3 x 3 m square. Each bin can hold 80 tons of rice seed having a density of 560 kg/m3. Four of these bins are sub-divided into 20-ton bins for certification purposes. According to the regulations, seed lots may not exceed 20 tons. After processing and before packaging, the seed is inspected and samples are checked in the laboratory.

To avoid contamination by seeds of other varieties, the dryers and storage bins are completely self-emptying with smooth sidewalls. The elevators can be cleaned easily and all horizontal transport is by open belt conveyers.

When the harvest has been finished, the dried seed is processed. This is done in two identical lines; light material is removed by air separation, small materials by screening and grading to specific gravity. If necessary noxious weeds (e.g. red rice) that are difficult to remove, can be separated in a dented cylinder.
Buffering bins have been installed on top of the machineries to ensure smooth operation.

The processed seeds are stored again in the silo and later moved into the 20-ton bins for inspection by the Certification Service. After approval, the seed is packed in two semi-automatic packaging lines, each having a capacity of 5 tons per hour based on 5-kg bags. The packaging system is based on volumetric dosing. Pre-printed polyethylene bags are used. After filling, they are sealed by a continuous bandsealer and put into paper outer bags, having a total weight of 40 kg; 25 bags are stacked on pallets to make loading units of 1000 kg. The bags are stored in the warehouse until delivery.

The processing plant is equipped with a laboratory for quality control during all operations, to check moisture content during drying and to determine germination force of the seed before delivery.

- LEGEND -

SYMBOLS:

E = ELEVATOR

CH = CHAIN - CONVEYOR

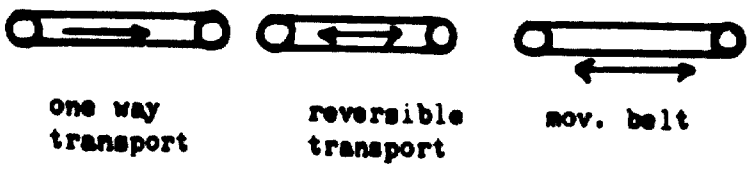
D = DRYER

B = BELT - CONVEYOR

= TWO WAY VALVE

L = LEFT PART OF PLANT

R = RIGHT PART OF PLANT



one way transport | reversible transport | mov. belt

A - Packaging station, consisting of:

- volumetric dosing unit and hopper containing ± 500 kg for handoperated packing of 5 and 10 kg poly-bags and also 25 bags.
- in height adjustable conveyor
- continuous sealer
- packing table for filling outerbags (40 kg)
- portable bag closer for sewing outerbags and 25 kg bags after labelling etc.
- stacking bags on pallets. Full palletloads (± 800 à 1000 kg) are transported by forklifttruck into warehouse.

N.B.: The above line shall have a capacity of ± 5 tons/hour so that two lines (L - and R side of the warehouse) will have a total packaging capacity of 10 t/h.

B - Intake pit with heavy iron grate, passable for all kinds of trailers, suitable for rear dumping and bottom discharging.

C - Container/trailer for collecting waste disposals (f.i. discards from precleaner).

D - Airscreen separator (min. cap. 3 t/h roughrice), provided with

- aspiration
- scalping screens and grading screens
- airseparation

E - Suction fan of airscreen separator

F - Indented cylinder (trieur twin type) for length separation. Min. cap. 3 t/h.

G - Special separator f.i. gravity separator or padi-table

H - Portable treater for applying chemicals before packaging

I - Dust collecting cyclone for airscreen separator

J - Central exhaust system

K - Volumetric dosing device for applying protectants before storage

L - Surge-bins in precleaning/weighing line

M - Pre-cleaner (reel type scalper with aspiration) cap. ± 50 t/h

N - Tipping - scale weigher cap. ± 50 t/h

O - Check - weigher cap. 50 kg

P - Automatic sampler

Q - Surge - hopper feeding pivoting filling belt B1

R - Fresh air fan for cooling after drying

S - Cool air inlets, one for each pair of drying columns

T - Warm air inlets (drying air), one for each pair of drying columns

U - Slides, discharging drying columns

V - Movable hopper - lorry with adjustable feeding on conveyor B2

W - Drying air fans for static column batch dryer

Y - Heater units for stationary column batch dryer

Z - Hopper to main elevators

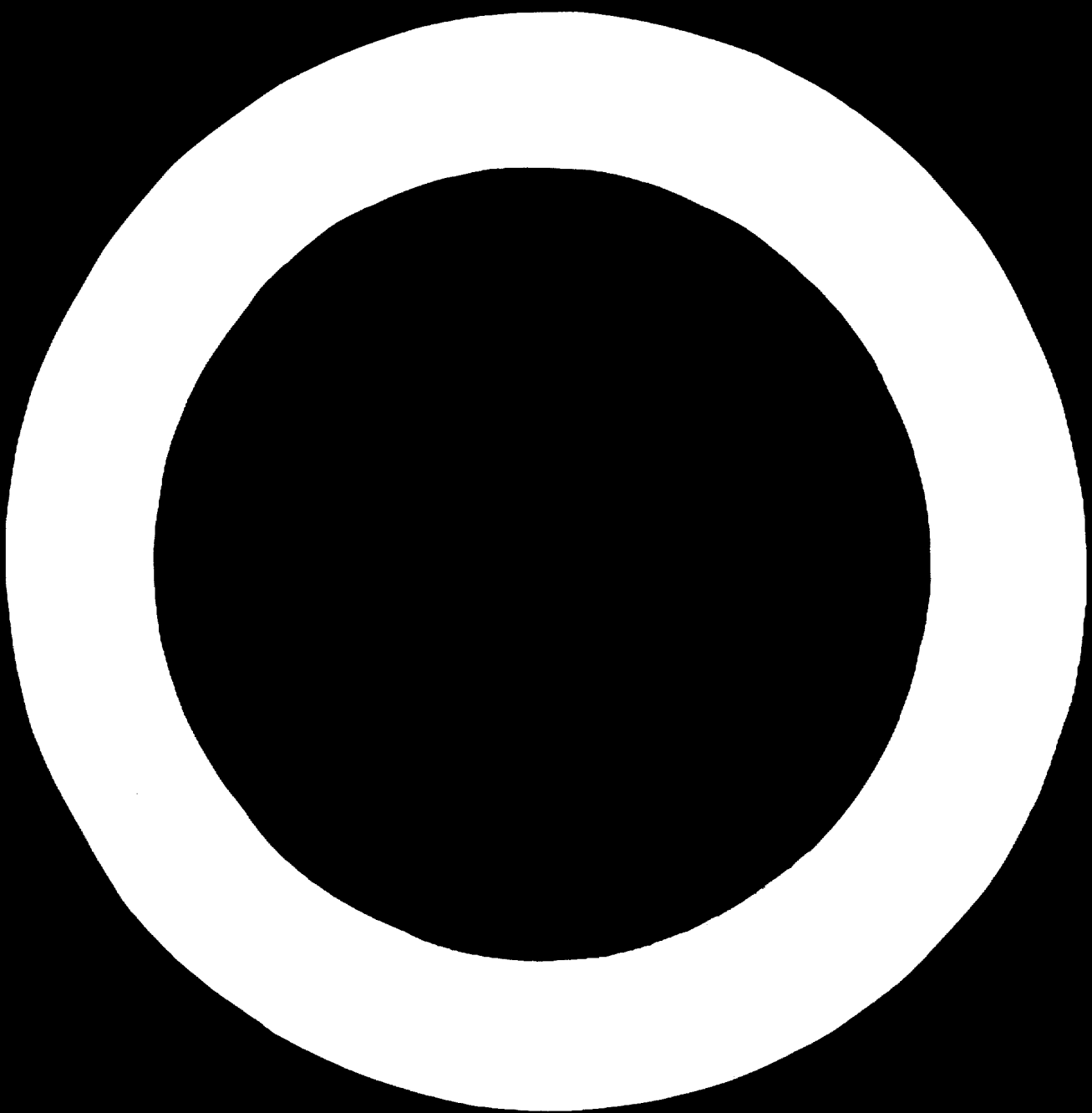
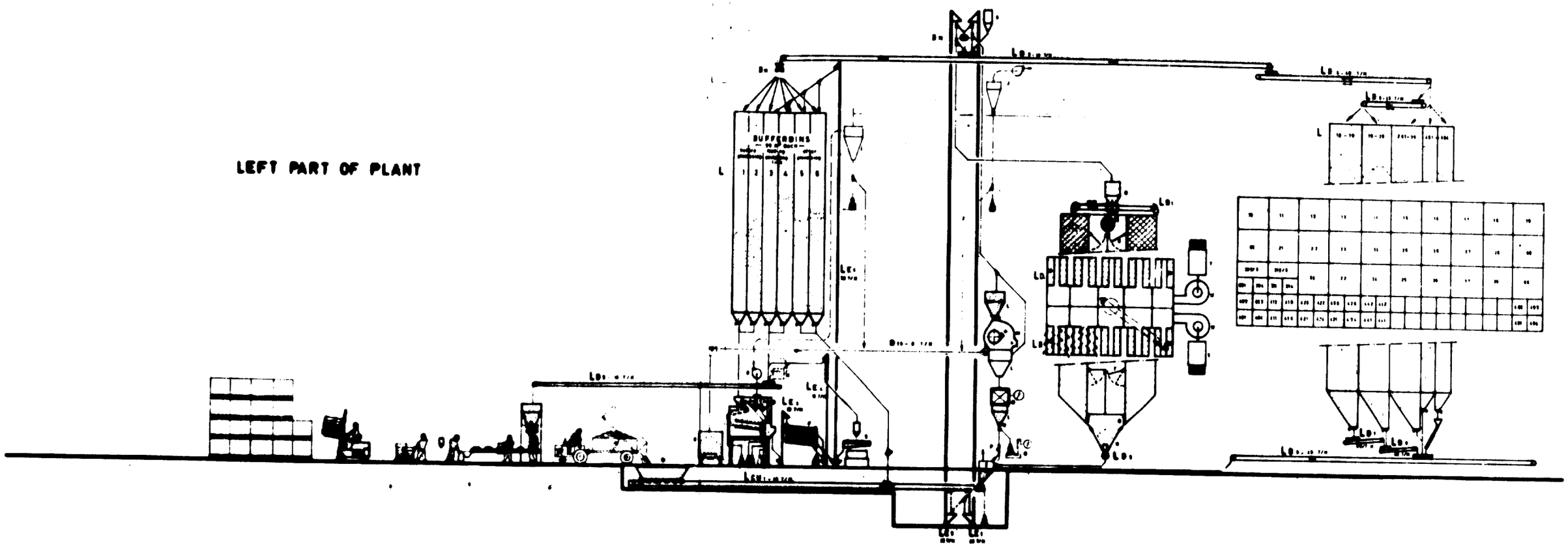


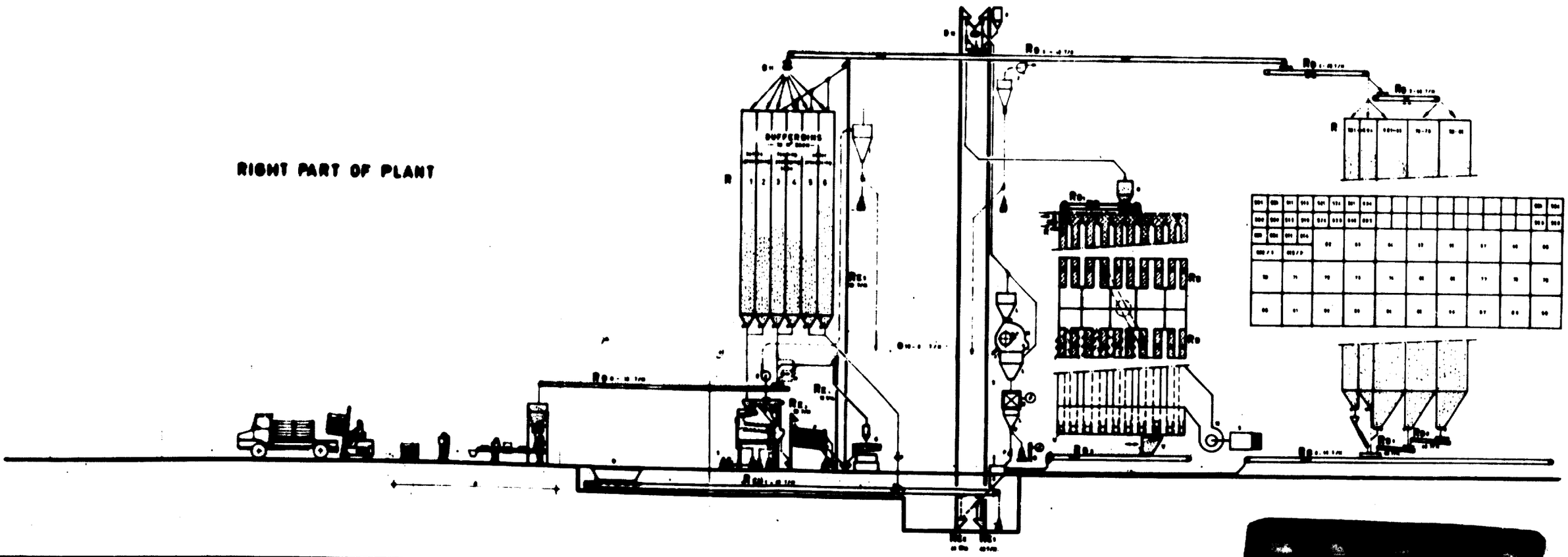
DIAGRAM SEED PROCESSING PLANT N.S.C. SUKAMANDI

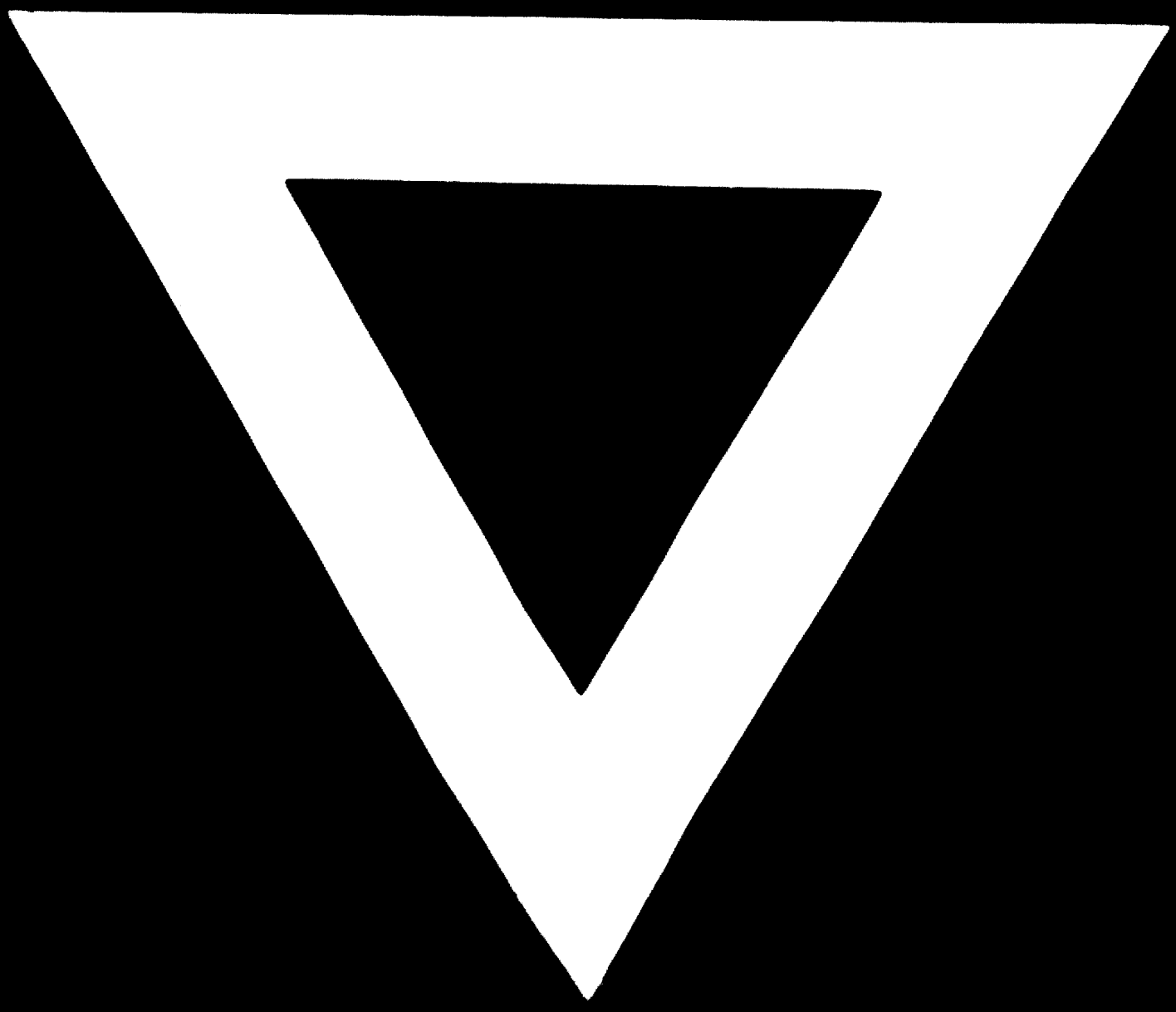
LEFT PART OF PLANT



OFFICE / LABORATORY — WAREHOUSE — INTAKE — MACHINERY - HOUSE — STORAGE

RIGHT PART OF PLANT





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