

A detailed botanical illustration of a rice plant. The central focus is a young rice seedling with several long, narrow green leaves and a fibrous root system. To the left, there are detailed views of a rice panicle (seed head) and a single rice grain. To the right, there is a larger, more mature panicle with many small grains. Below the main plant, there are several individual rice grains and a cross-section of a grain showing its internal structure. The illustration is rendered in a classic scientific style with fine lines and naturalistic colors.

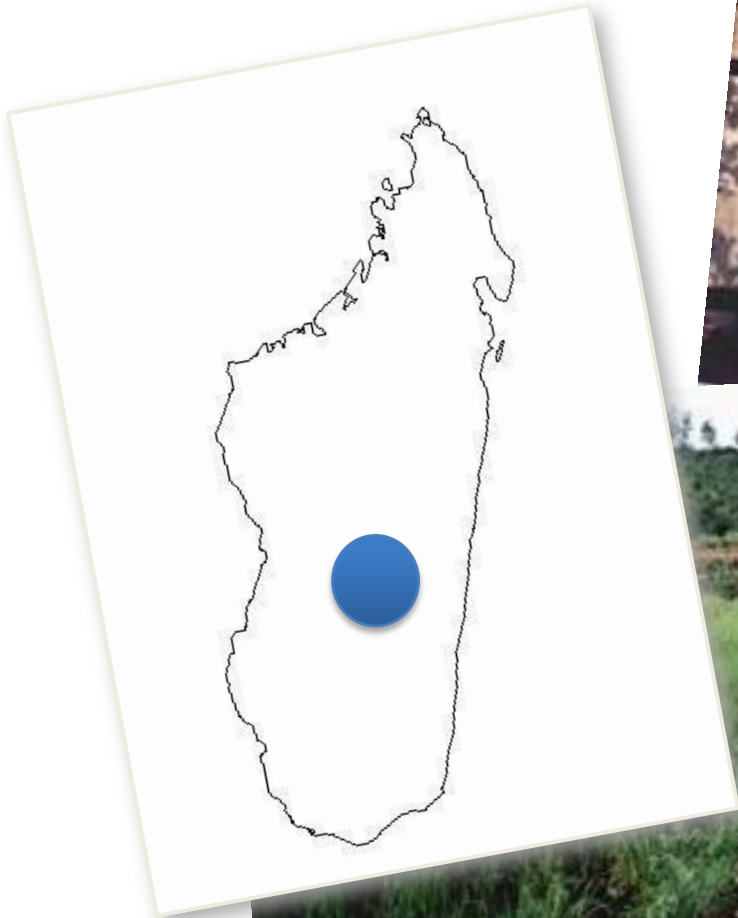
The System of Rice Intensification in India:

Historical Antecedents and
Future Perspectives

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SRI workshop, Delhi, 19–21 June 2014



Fr. Henri de Laulanié
(1920-1995)

- French
- Jesuit missionary
- Agronomist (INRA)
- 34 years in Madagascar
(1961-1995)
- Central highlands



NEW
& improved

PART II

Local seed production

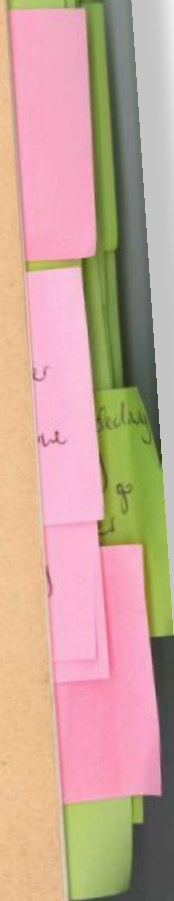
J. P. DOBELMANN
Ingénieur d'Agriculture
Directeur de la Station Rurale de Marovoay — Madagascar

MANUEL
DE
RIZICULTURE AMÉLIORÉE
à l'usage des Conseillers ruraux

PRÉFACE DE
M. R. DUMONT
Professeur à l'Institut National Agronomique

TANANARIVE
— 1961 —

308F28



... par l'absence des panicules fertiles, ou tout au moins norma-
lement constituées.

Le tallage est donc favorisé :

- 1 — par le repiquage de plants jeunes.
- 2 — par le repiquage à un ou deux brins.
- 3 — par des écartements rationnels en fonction de la variété et de la richesse du sol.
- 4 — par des sarclages précoces pour éviter la concurrence entre le riz et les plantes adventives.
- 5 — par la richesse du sol en azote.

En culture repiquée le tallage revêt une importance considérable et c'est lui qui permet d'obtenir...

J. P. Dobelmann (1961)

“Tillering is thus favoured:

- 1. by the transplanting of young seedlings**
- 2. by transplanting of one or two seedlings [per hill]**
- 3. by spacing distances that are rational according to the variety and the richness of the soil**
- 4. by early weeding in order to avoid competition between the rice and adventitious weeds**
- 5. by the richness of the soil in nitrogen”**

R. DUMONT

Ingenieur Agronome et d'Agronomie Coloniale
Ex-directeur de la Station de riziculture du Tonkin
Chef de Travaux d'Agriculture à l'Institut Agronomique
Membre de la Commission d'Agriculture
de la Conférence Economique Coloniale

LA CULTURE DU RIZ

DANS LE DELTA DU TONKIN

Étude et Propositions d'amélioration
des Techniques traditionnelles
de Riziculture tropicale

PRÉFACE

DE

M. Yves HENRY

Inspecteur général d'Agriculture des Colonies
Membre de l'Académie d'Agriculture de France



PARIS
SOCIÉTÉ D'ÉDITIONS
GÉOGRAPHIQUES, MARITIMES ET COLONIALES
17, RUE JACOB (VI^e)

1935

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OUTILS DE SARCLAGE JAPONAIS. — Les Japonais, qui attachent la plus grande importance aux nettoyages, en donnent géné-

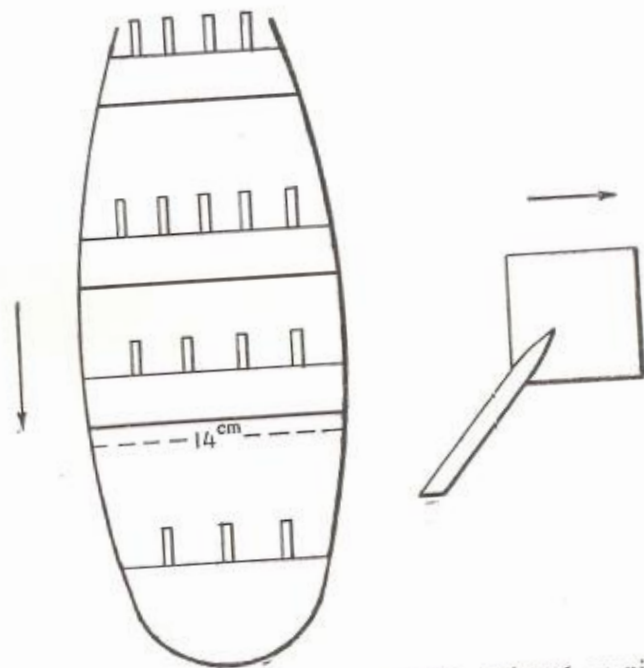


FIG. 27. — Outil de sarclage japonais, actionné au pied ou à la main, vu par en dessous ; section d'une barre et d'une dent ; la flèche indique le sens du déplacement.

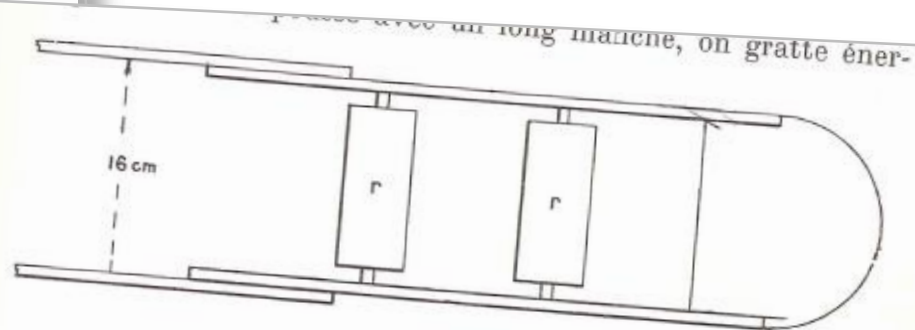
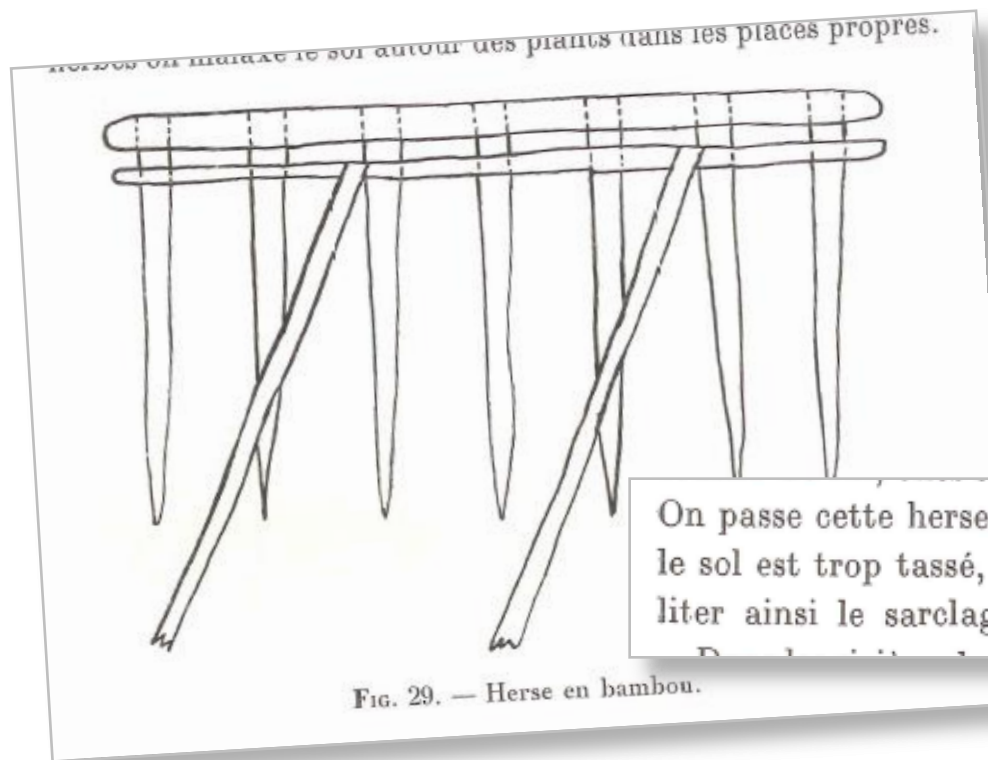


FIG. 28. — Outil de sarclage japonais, muni de deux rouleaux sarclers *r*, et, à l'avant, d'un patin l'empêchant d'enfoncer dans la boue. Au-dessous, deux types de rouleaux sarclers, en coupe et plus grossis.



R. Dumont (1935)

“One uses this harrow a month and a half after transplanting, when the soil is too compacted, in order to aerate it, loosen it, lift it and so facilitate the weeding with the rake that follows.”

PADDY IN MADRAS PRESIDENCY.

(Extract from Report of the Madras Department of Agriculture, 1907-8.)

PADDY.—This, the most valuable and important crop of the Presidency, is now receiving the attention it deserves. Experiments are being made on all the wet land farms to ascertain the best number of seedlings to plant in a bunch, and the best distances for planting. Mr. Sampson was the first to commence these experiments on some of the House Farms under his management under the Court of Wards. Their object is, firstly, to see whether better crops, i.e., crops yielding more grain of better quality, cannot be got by allowing each plant more room for the proper development of its root system; as many as fifty tillers have been observed on a single plant which had full room for development; and, secondly, to save waste of seed. The cost of weeding is reduced, and possibly an economy of water can also be effected. As much as 150 lbs. of seed is sown per acre in parts of the Presidency. In the Southern districts

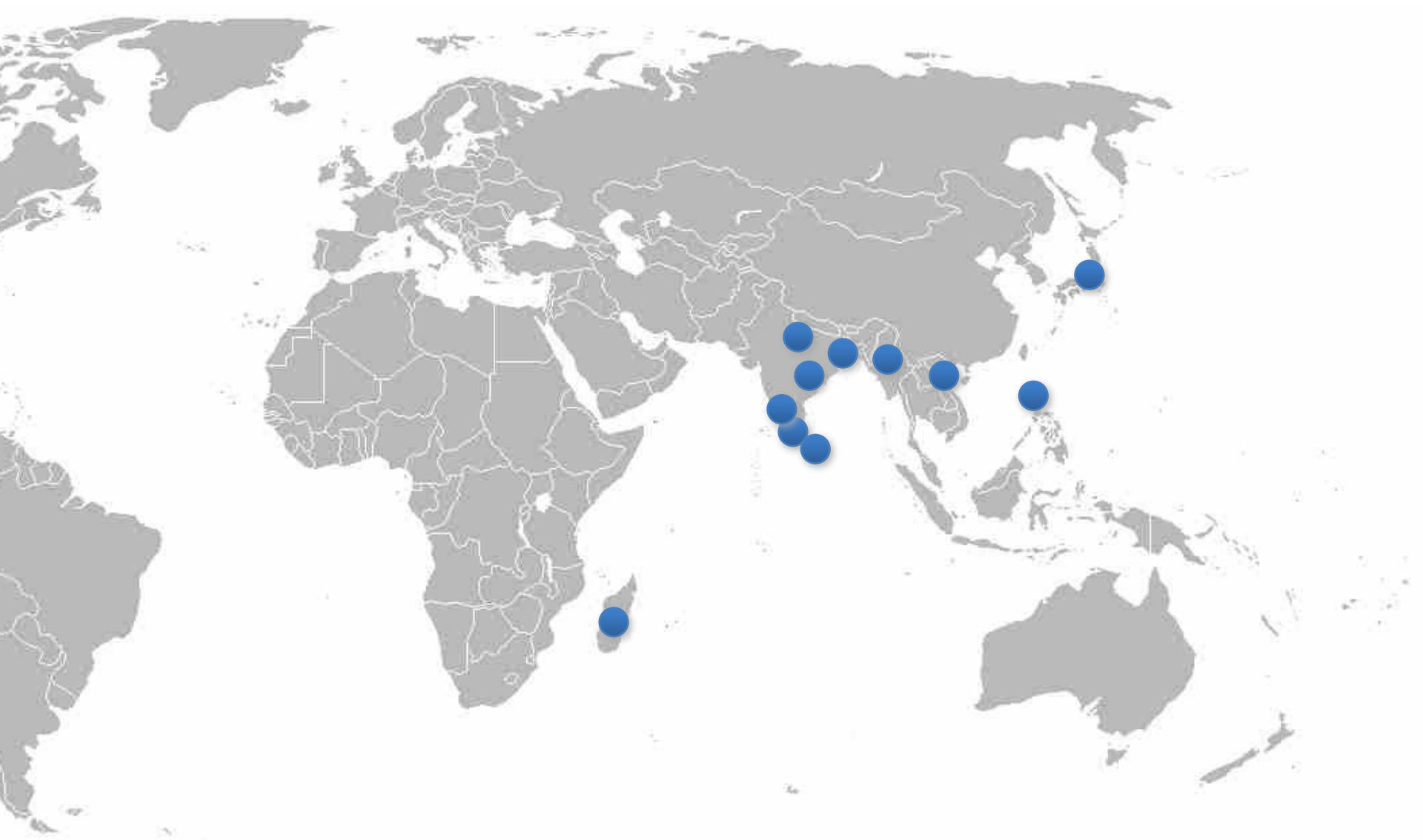
IMPROV
COURT

SIVAGIRI
west of Sa

Agric

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Demtchinsky Method

- Russian agronomists
- c. 1909-1911
- N European cereals – rye, oats etc.
- Transplanting, wider spacing
- Emphasis on root development and tillering
- Attracting attention from German, French, Dutch, British agronomists
 - Referred to by Parr (1911), Dy. Dir. Agriculture, United Provinces, India

INDIA'S RICE REVOLUTION

1956!

JMPC/JMRC

1. Thin sowing in seed-bed
 - Produces seedlings within 15-16 days
2. Transplanting + wide spacing
3. Gentle handling of seedlings
4. Row planting + intercultivation
5. Fertilisation

Masagana/Margate Method

- Philippines
- Transplanting, spacing, intercultivation
- Encouraging tillering
- Heavy fertilisation with manure and compost
- Partly attributed to farmer innovation (Eugenio Margate)

1. Young seedlings
2. Single seedling per 'hill'
3. Wider spacing
4. Sparse irrigation
5. Early and regular weeding
6. Organic compost

Single seedling

- Single-seedling method in India (c. 1905-1928)

“The results demonstrate that there is no need to transplant more than one seedling per hole”

(Smith, 1907; Burdwan, Bengal)

C. METHODS OF CULTIVATION—

(1) Implements—

(a) *Surat Bakhar* vs. Local Plough.

(b) *Surat Bakhar* vs. Local Plough.

(2) Sowing—

(a) *Surat Bakhar* and thin sowing broadcast.

(b) Spacing in transplanting.

(c) Number of seedlings per hole in transplanting.

Wider spacing

- Spacing distances up to 2' or 2½' (61cm, 76cm)
(*Indian Agriculturist* 1911, Tanjore District, Madras [Thanjavur District, Tamil Nadu])

Sparse irrigation

- *“paddy irrigated and then allowed to become almost dry ... can withstand drought for a longer time.... not letting irrigation water into the plots until the surface of the soil had just begun to crack”* (Lonsdale 1909, Sivagiri, Madras [Tamil Nadu])
- Local practice of keeping field dry for c. 5 days after each intercultivation (Dumont 1935, Kep irrigation area, French Indochina [Vietnam])

Gentle handling of seedlings

- Reported practice of Mr. Kolandavelu Udayar
(*Indian Agriculturist*, 1910, S. Arcot District, Madras [Viluppuram, Tamil Nadu])
- *“Pick out the seedlings with tender care transplant them streight [sic] according to new method.”* (Gandhi Smarak Nidhi 1953, Japanese Method, Bombay [Mumbai])

Sceptical neighbours

- *“Many ryots in the neighbourhood were ... seen laughing at the owner ... for his foolishness... In a fortnight the plants began to tiller very freely... The growth of the plant was more luxuriant than the neighbouring plants...”* (Indian Agriculturist 1907, Perintalmanna, Madras [Kerala])

Reluctant labourers

- *“Some difficulty may at first be experienced in getting the transplanting coolies to transplant single seedlings. Therefore, until they get into the way of it, close supervision is necessary. If, however, the seed beds are grown as above described, the seedlings are themselves sturdy and are easily separated one from the other, and not too much difficulty will be felt.”* (Sampson, 1909, Madras Presidency)

Family labour

- *“Demtchinsky reckons this first method (transplanting) can only be applied successfully in small farms, where most of the work is done by the farmer and his family”* (Mayer-Gmelin, 1910, Netherlands).
- *“[The Demtchinsky Method] has since proved profitable and practicable on some of the small Russian holdings where the whole of the work is done by the peasant and his family”* (Parr, 1911, United Provinces [Uttar Pradesh/Uttarakhand], India)

We should have learned

- Norman Uphoff on SRI:
- *“Our SRI experience shows that, for thousands of years, farmers have been ploughing their soils too much, have flooded their fields too much and have planted too many seedlings, wasting water and seeds and lowering yields. And millions of farmers must have seen that the rice plants in the upper portions of their fields, which are better drained, were growing better than those in the lower parts of their fields. Farmers should have figured out that it is better to use fewer seeds, but didn’t.”* (Quoted in recent *Farming Matters*)

We should have learned

- Demtchinskys on *Ackerbeetkultur*
- *“All these examples ... should have alerted western agriculture that plants would tiller lushly and produce ripe ears with ample grains if they were freed from the care of men, with their cultivation methods, which destroy something in the plants’ nature. But neither the scattered notes of scholars nor the vast experience of China, which we completely disregarded, could divert theoretical thinking from its own self-imposed boundaries, and moderate tillering remained the ideal of modern agriculture until the present because, as they say, with stronger development of the stalks lodging must inevitably occur, which is equivalent to the loss of the whole crop”*
(Demtchinsky & Demtchinsky, 1911)

Tillering and spacing

- *“The consensus of opinion ... is that tillering and production of grains are affected by the distance at which the plants are set apart in the field... Under certain conditions, closer planting may give higher yield than wider planting. But it does not necessarily follow that closer planting is also more profitable...”*
(Rodrigo, 1924, The Philippines)

PLANTS TROP VIEUX OU TROP JEUNES. — La durée du séjour en pépinière, précédemment indiquée, nous donne l'âge des plants — des « ma » comme disent les cultivateurs annamites — au moment du repiquage. Le plant bon à repiquer est bien plat, on le vérifie en le prenant entre les doigts au-dessus du collet ; la section des gaines de feuilles qui constituent la partie aérienne est elliptique allongée. Un « ma » rond indiquerait un début de formation de tige, donc un plant déjà âgé ; si en l'ouvrant on trouve un premier nœud séparé du collet par un entre-nœud, le plant est trop vieux. Un seul nœud durci au niveau du collet indique un plant juste à la limite.

Des plants trop vieux se développent peu. la tige se coude

R. Dumont (1935)

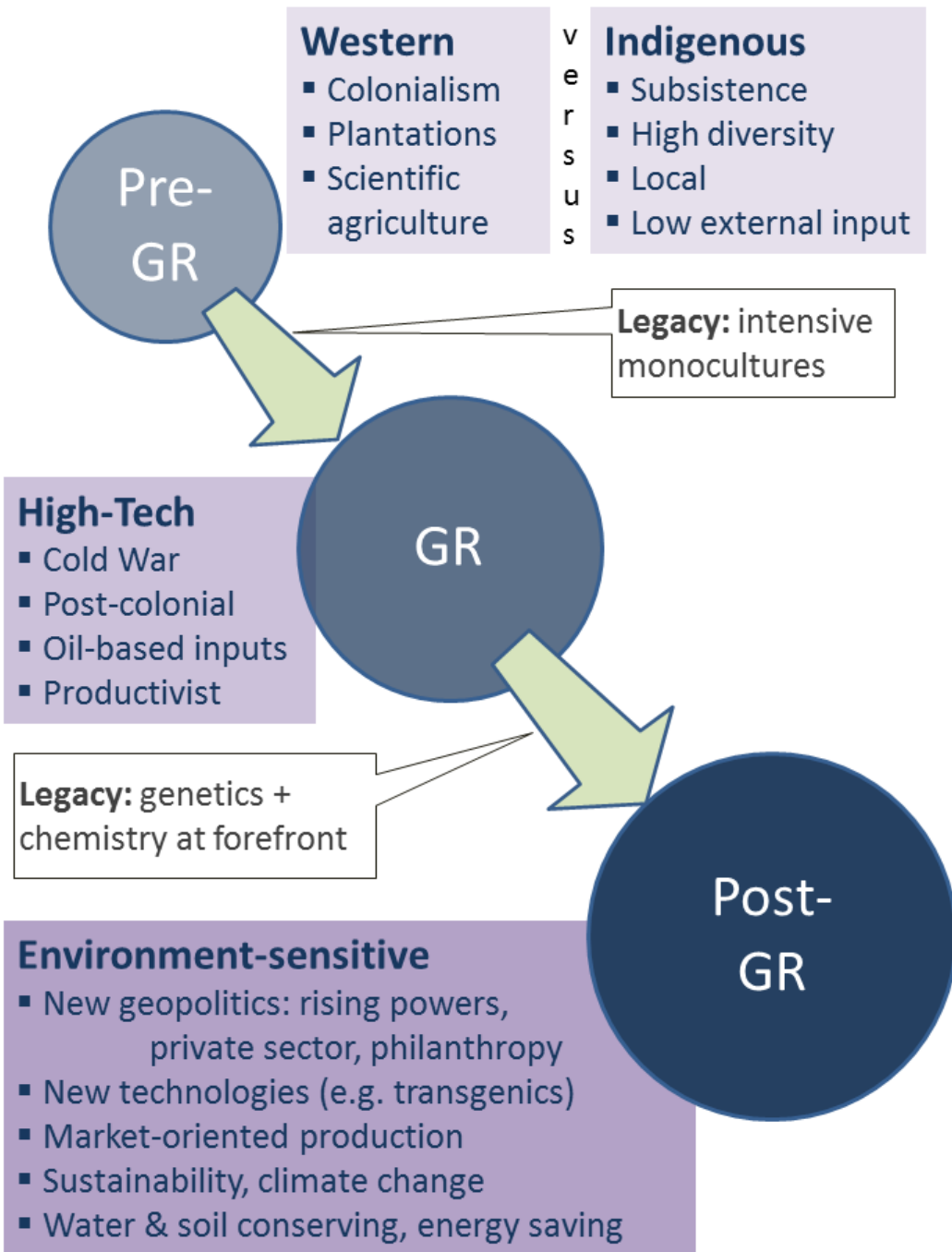
“PLANTS TOO OLD OR TOO YOUNG... A seedling good for transplanting is quite flat, one verifies this by taking it between the fingers above the crown; the section of the leaf sheaths which constitutes the above-ground part is elliptical and elongated. A rounded “ma” indicates the beginning of the formation of the main stem, thus a plant that is already quite old; if on opening it one finds a first node separated from the crown by an internode, the plant is too old. A single firm node at the level of the crown indicates a plant just at the limit.”

Déjà vu

- *“There is nothing really new about these methods... Rice farmers in some places have been following these customs for thousands of years” (Masagana/Margate Method)*
- *“The Japanese method is not entirely new to India. Some of the practices employed by paddy-growers show that most of its important features have already been in vogue in several parts of the country” (JMPC)*

Conclusions

- Neither general principles nor practices of SRI are completely novel
 - On the contrary, they have been discussed, investigated, promoted, practised, (also argued about, struggled with, rejected, adapted, etc.) for many decades, if not longer
- Contemporary SRI experience has paid little or no attention to this historical record
 - Real risk of revisiting failed experiments, repeating mistakes, failing to learn from previous experience



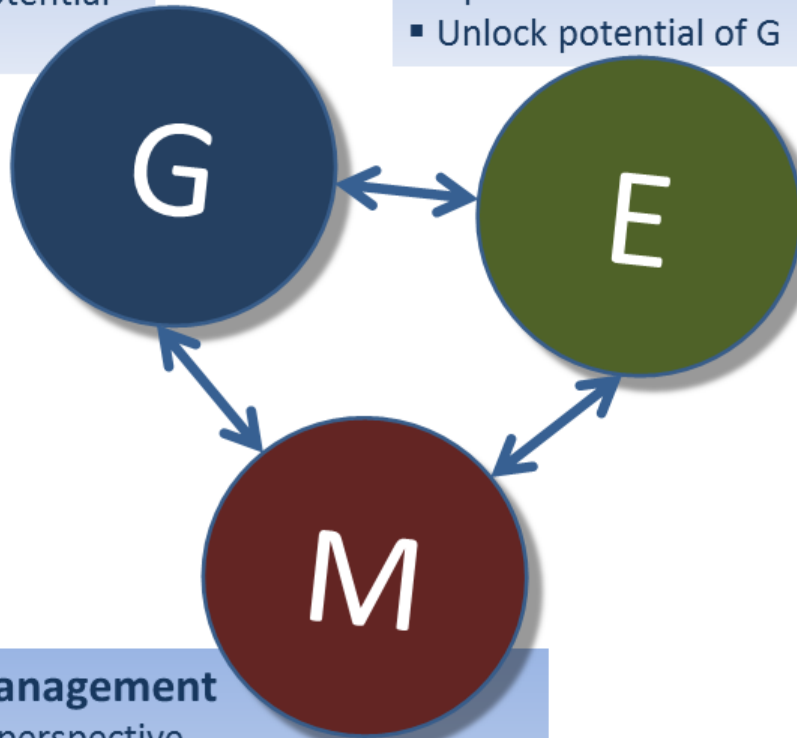
Green Revolution as a historical anomaly

Gene / Genetics

- Breeders' perspective
- Optimise G
- Exploit potential of E

Environment

- Field agronomists' perspective
- Optimise E
- Unlock potential of G



Skilful Management

- Farmers' perspective
- Exploit G & E within integrated livelihood strategy
- Deploying skills, knowledge & experience
- Situated in time: dynamic, uncertain, risky ('farming as performance')
- Embedded in social networks & cultural frames

Not just **G**,
not just **E**,
but **G**×**E**×**M**:
Skilful
management



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Of yield gaps and yield ceilings: Making plants grow in particular places

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ABSTRACT

The System of Rice Intensification (SRI) and rice genetic improvement are proposed as two approaches to improving and increasing rice production. In recent exchanges, they have been represented by their respective supporters as starkly contrasting, almost mutually incompatible alternatives. However, advocates on both sides of this argument have tended to stress the genetic and physiological characteristics of rice plants and place less emphasis on the spatially and temporally situated knowledge and management skills of farmers, which are the means by which any agricultural technology is locally adapted and integrated into livelihood strategies, and technological potential is translated into real outcomes in specific settings. Taking this proposition seriously would entail a substantial reorganisation of agricultural research and extension, bridging the historical divide between these two wings of professional agronomy. It would require agronomists of both types to work more collaboratively with farmers. It would also require scientists to produce new kinds of outputs, such as analytical frameworks, heuristics and decision-making tools to help farmers apply scientific insights to their own constrained circumstances. This argument is made with reference to the cases of SRI (a cultivation system that is said to boost farm yields without the need for genetically improved germplasm) and C4 rice (a crop-improvement project intending to 'supercharge' rice photosynthesis to increase rice yields). The paper uses the agronomic concepts of the 'yield gap' and the 'yield ceiling' to offer a perspective on strategic questions about the goals and organisation of agricultural research and extension.

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