Strengthening competitiveness through better seed system

Madagascar PAPRiZ 1, Fertility evaluation of Malagasy soils by pot culture, J. Yamaguchi, June 2015

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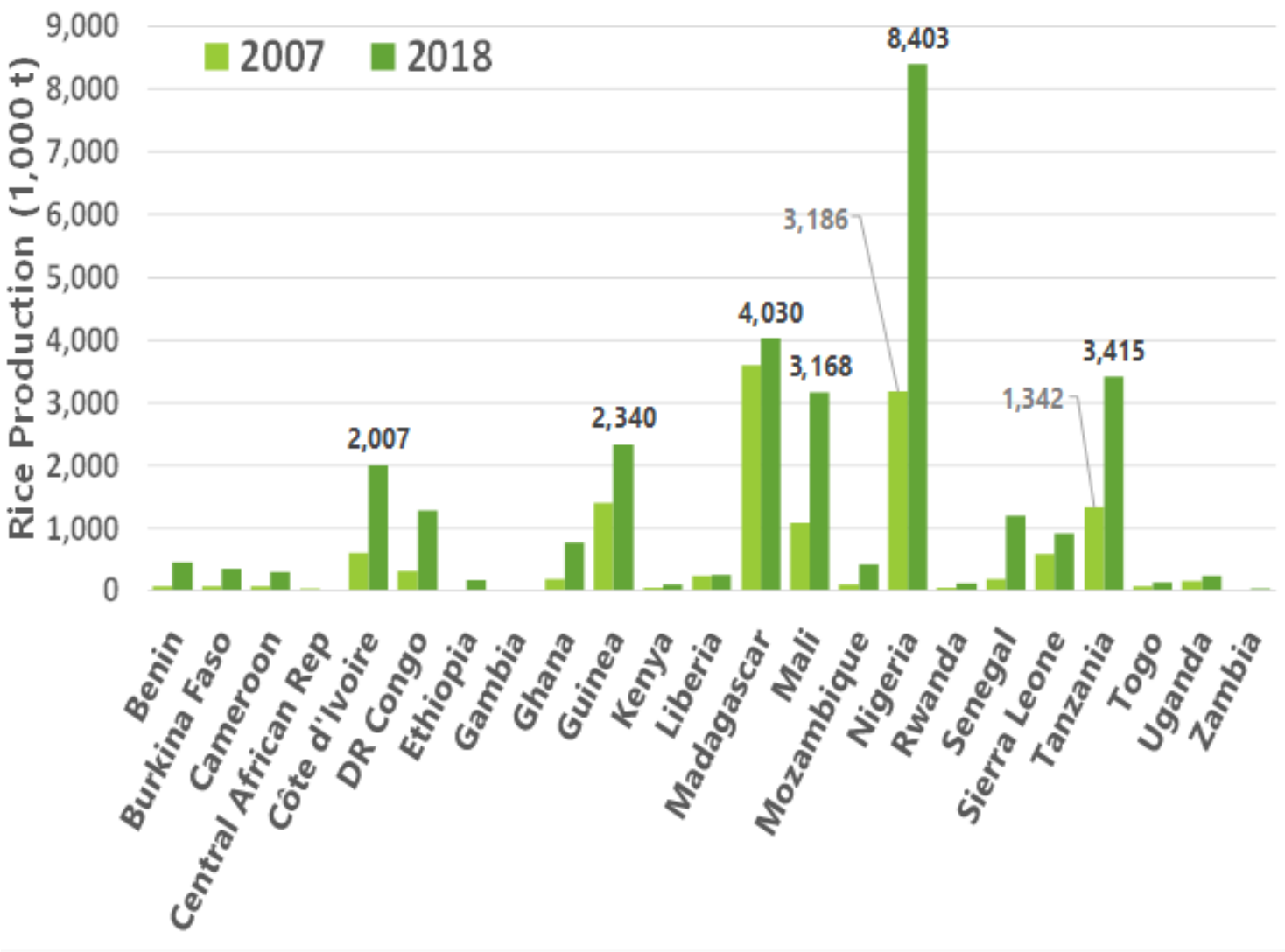
Contents:

- Need for increased rice production
- Better seed required for competitiveness in rice
- Seed system
- Human resource and capacity building

Ahero Irrigation Scheme, Kisumu, Kenya

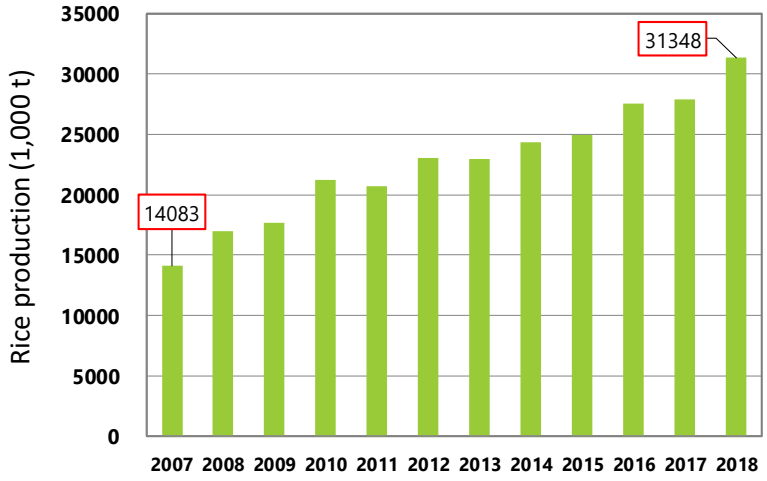
Need for increased rice production

Change in rice production in SSA

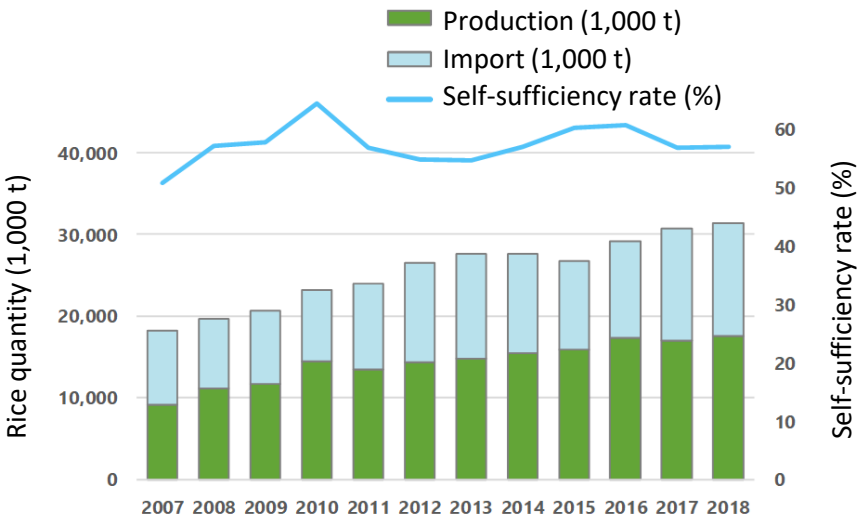


Rice production and import in SSA

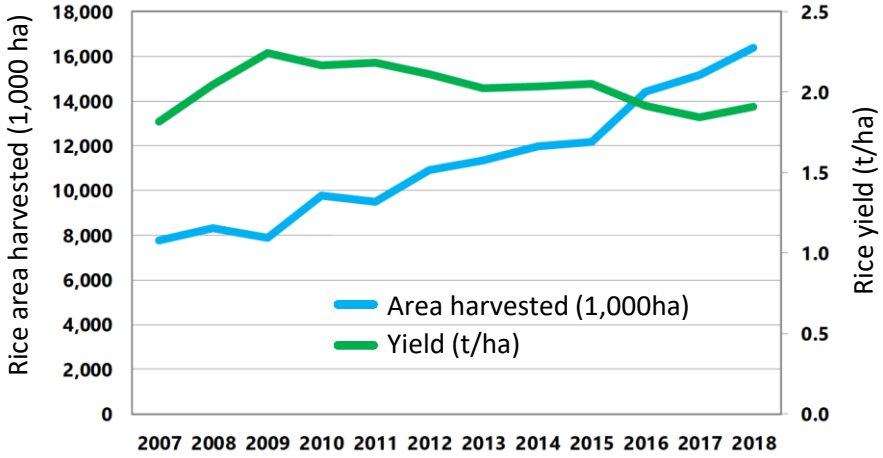
Production (paddy)



Production, import and self-sufficiency (polished rice)



Area harvested and yield



Two issues to be addressed:

- **Increase of rice production**
- **Strengthening competitiveness**

Source: All three figures are from JICA (2021, forthcoming) "CARD rice technical manual," figures created using data retrieved from FAOSTAT's "Crops" data (top left and bottom left) and "Food Balance Sheet" (top right).

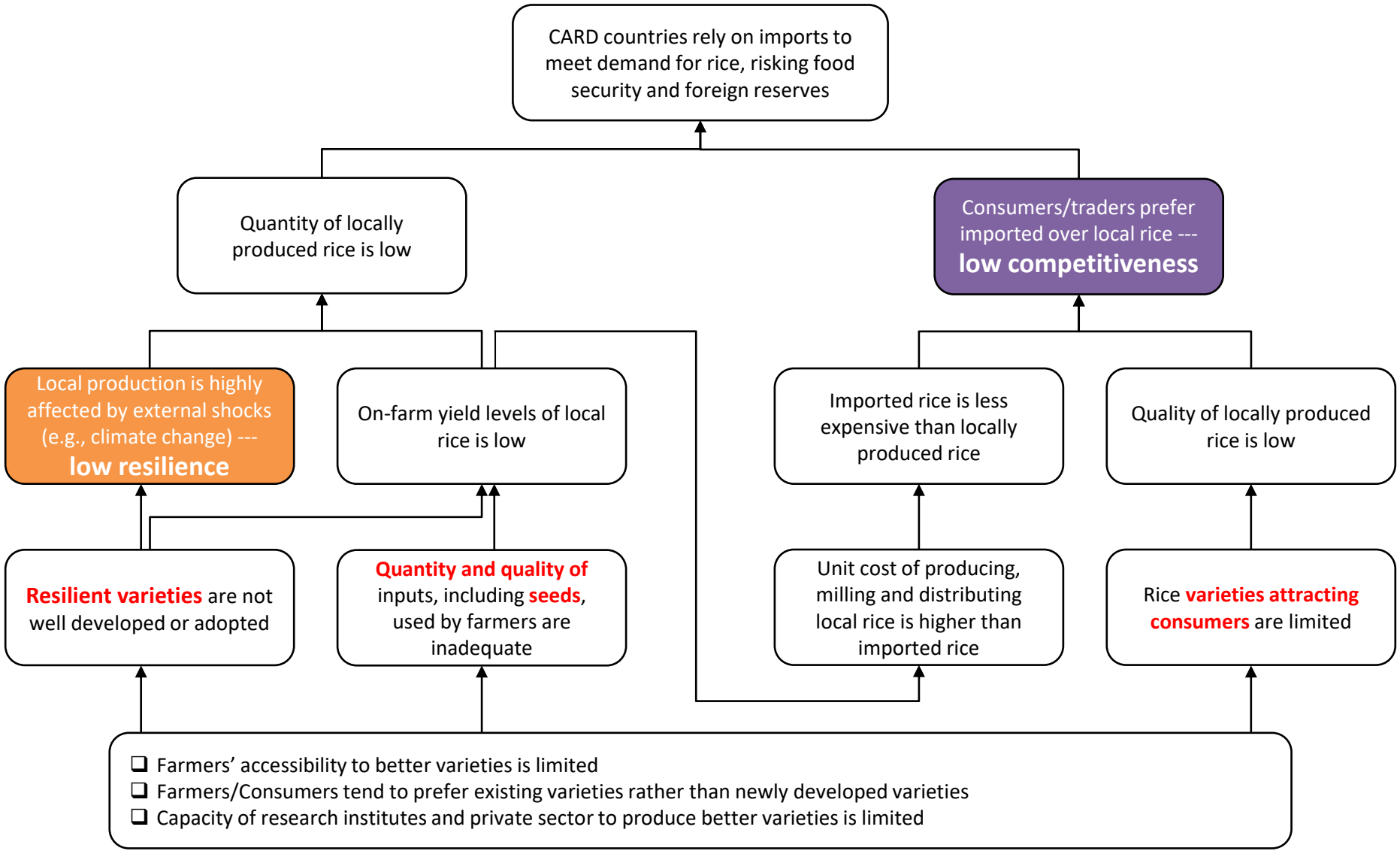
Technical aspects for increased rice production

- **Productivity**（increased yield/ha）
  - High quality seeds
  - Paddy fields with infrastructure including irrigation facility
  - Good agricultural practices　ex. Field preparation, water management, fertilization, plant protection
  - Harvesting, drying and other post-harvest technologies
- **Cultivation area**（extension to less favorable area)
  - Development of cultivation technology for newly-cleared and/or rehabilitated lands
  - Technology transfer and dissemination
  - Marketing of products　ex. Quality, purity, no-contamination

Who is supposed to work for technology development?

Seeds for resilience and competitiveness

Seeds for resilience and competitiveness



Source: Extract from the *problem tree*, developed by CARD Secretariat, modified for this presentation

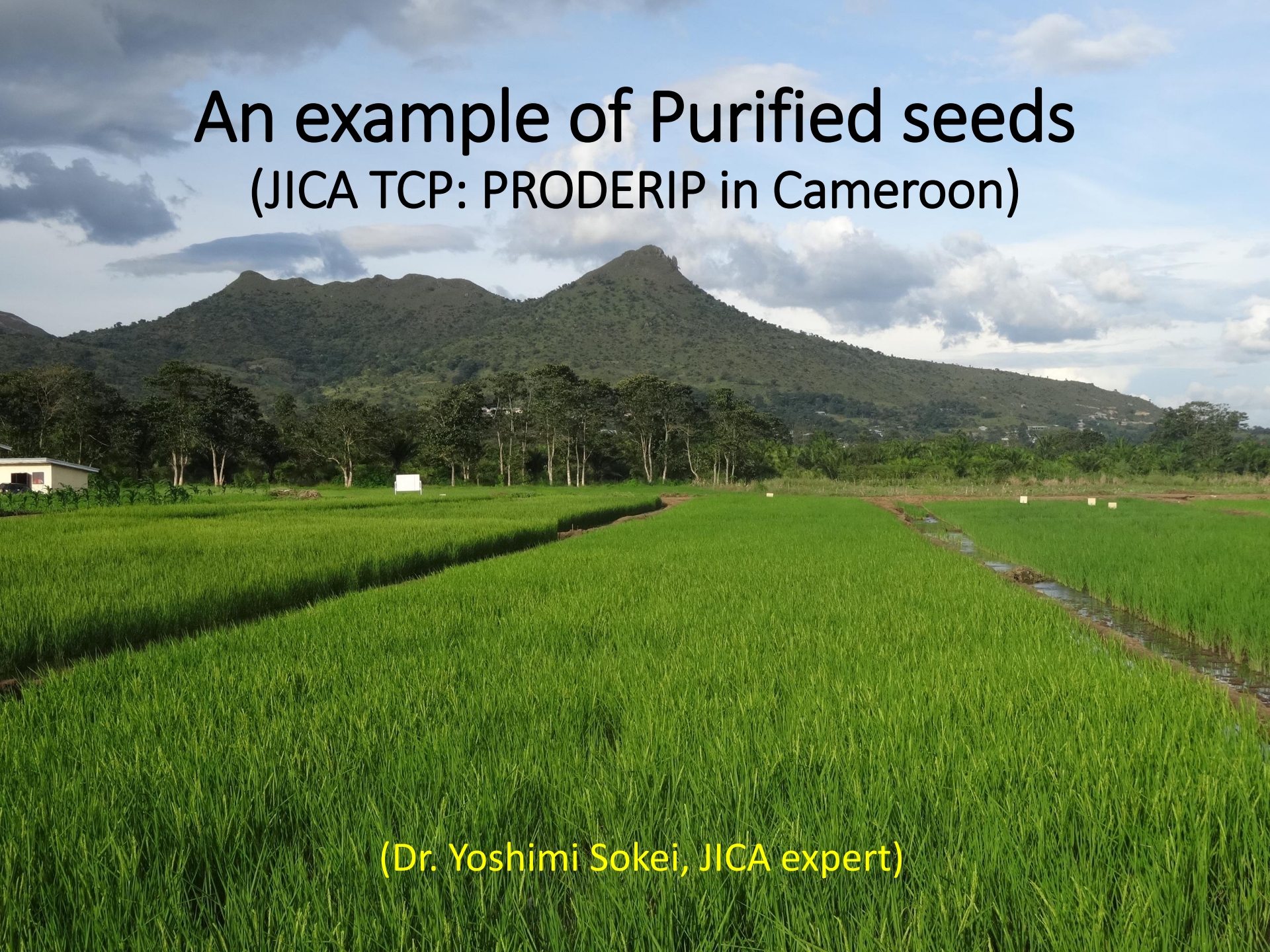
Characteristics of Seeds improving resilience and competitiveness

- **Resilience**
  - Tolerance to drought, cold stress and salinity
  - Disease-resistance etc.

- **Competitiveness**
  - High yielding
  - Purity (Purified seeds: ex. PRODERIP (JICA TCP in Cameroon))
    (Quality Declared seeds): ex. In Uganda)
  - Fit to market preference

Who is supposed to work on seed system?

An example of Purified seeds
(JICA TCP: PRODERIP in Cameroon)



(Dr. Yoshimi Sokei, JICA expert)

Begun variety purification in 2014

Seed quality

Purified TOX

Non-Purified TOX

Table 6. Yield and Culm length, panicle length, and the number of panicles at harvesting between selected lines and non-selected varieties cultivated in UNVDA area. Lower case letters compare lines within each variety. The number followed by the same letter are not significantly different ($P<0.05$).

Variety	Lines	Yield (g/ m^2)		Panicle Length (cm)		No. of panicles ($hill^{-1}$)	
		Mean	SE	Mean	SE	Mean	SE
TOX 3145	Selected 1	**725.0^{a}**	97.1	28.2^{a}	0.62	7.1^{b}	0.66
	Selected 2	570.0^{b}	41.4	26.4^{b}	0.21	9.5^{a}	0.13
	Non-selected 1[1)]	**545.1^{b}**	53.0	26.8^{ab}	0.54	7.7^{b}	0.26
	Non-selected 2[2)]	540.8^{b}	63.8	26.3^{b}	0.71	7.7^{b}	1.00
	Mean	613.4	59.6	26.9	0.50	8.0	0.45
Local	Selected 1	**648.6^{a}**	37.8	24.6^{a}	0.76	6.7^{b}	0.57
	Selected 2	597.0^{b}	18.5	23.8^{a}	0.34	7.2^{b}	0.25
	Non-selected 1[1)]	**504.3^{c}**	30.4	23.8^{a}	0.28	9.2^{a}	0.54
	Non-selected 2[2)]	583.1^{b}	13.3	24.4^{a}	0.34	8.6^{a}	0.69
	Mean	583.3	25.0	24.2	0.35	7.9	0.48

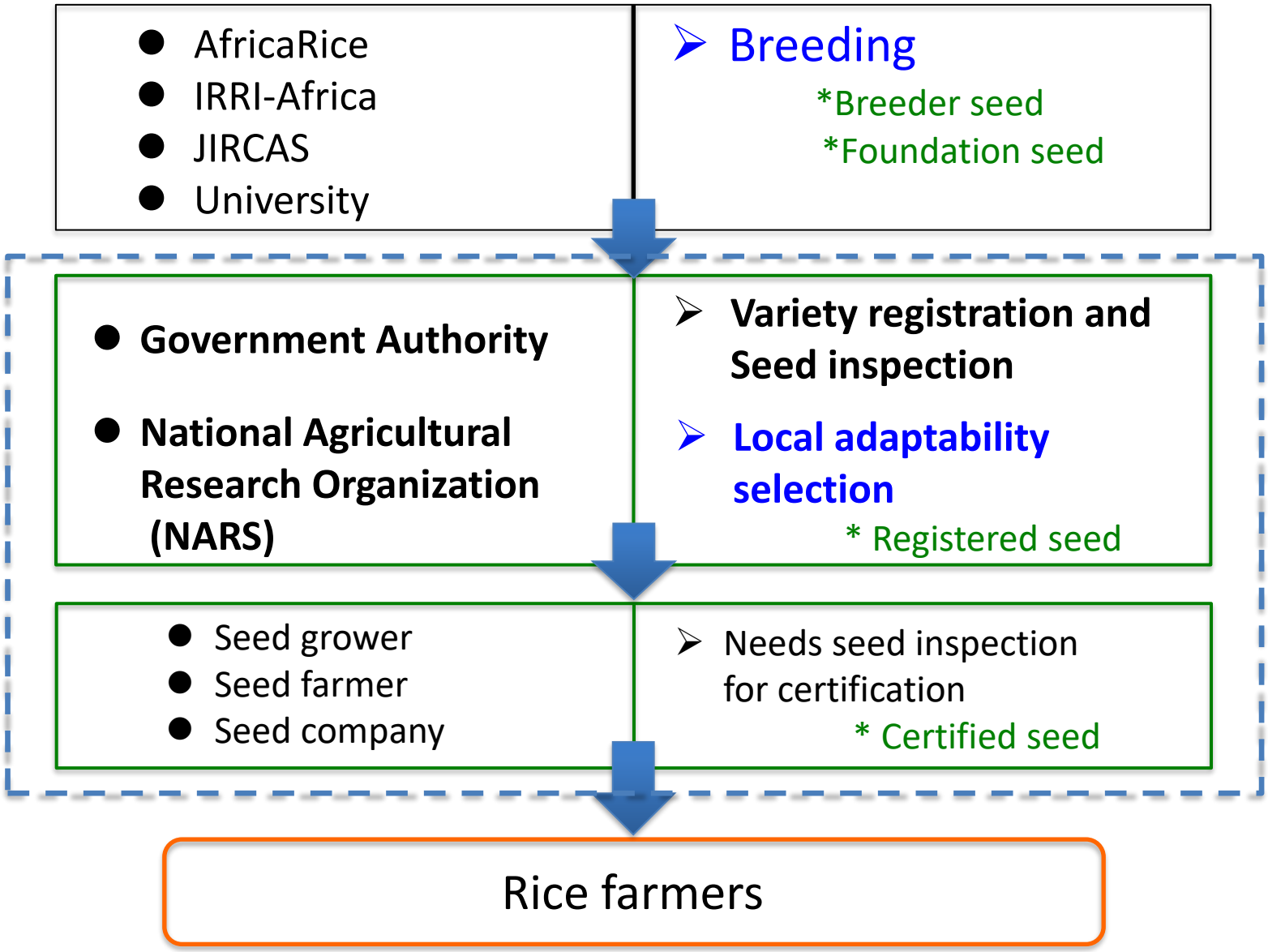
[1)] Bulk harvesting at maturing time in each plot level.

[2)] Harvesting each hill individually when each hill matured.

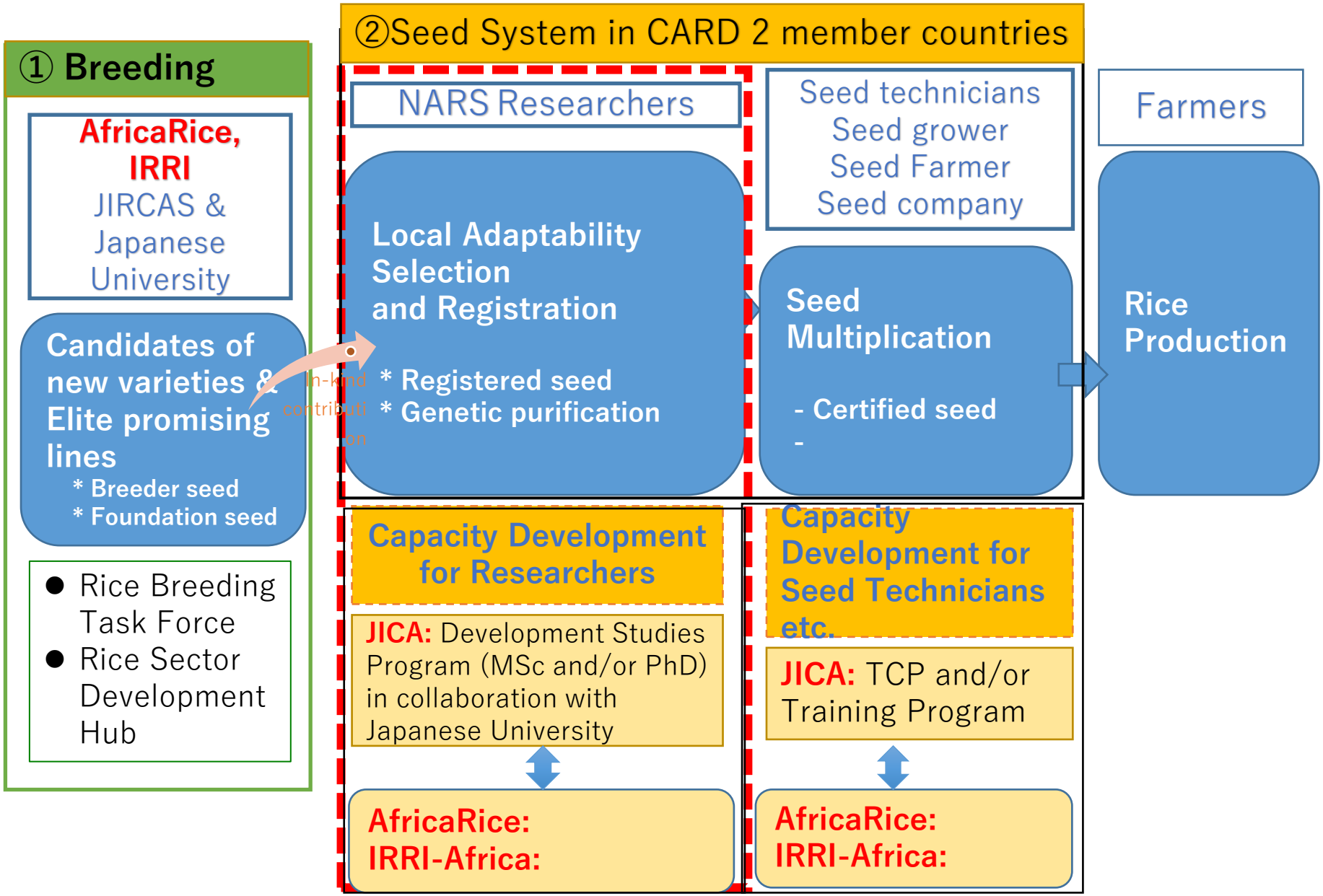
Purified seeds give higher yields, then competitiveness!

Seed system

Tripartite collaboration for seed system



Possible collaboration scheme in rice seed sector among IRRI, AfricaRice, JIRCAS, Japanese Universities and JICA in CARD 2



(Questionnaire survey, January 2021) Breeding and Certified seed production of some CARD member countries

- Cameroon, Ethiopia, Ghana, Madagascar, Mozambique, Nigeria, Senegal, Sierra Leone, Uganda, Zambia

1. NARS works mainly on introduction breeding for the adaptability selection from among a set of promising lines of rice given by Africa Rice, IRRI and others and variety registration for her country;
2. Quality control is not well managed in most cases through the certified seed production due to several reasons such as seed contamination and imperfect seed inspection and so on;
3. There are some cases showing that high quality seeds selected from local varieties in the field could result in higher production of rice; and
4. If consumers change their preference to good quality rice with comparatively higher price, then rice farmers may be motivated to use certified quality seeds because such seeds are possible to give them more benefits.

- *Common understanding on the benefits of good quality rice !*
- *Increase of needs for certified high quality seed.*
- ***Needs human capacity building regarding the seed system.***

Human resource and capacity building

Capacity development for NARS's human resources

Needs

(NARSs and Public sectors)

Researchers

- Rice breeding
- Crop physiology
- Agronomy
- Soil science
- Plant nutrition
- Pathology
- Entomology
- Others

Administrators

JICA Development Studies Program (MSc and/or PhD)

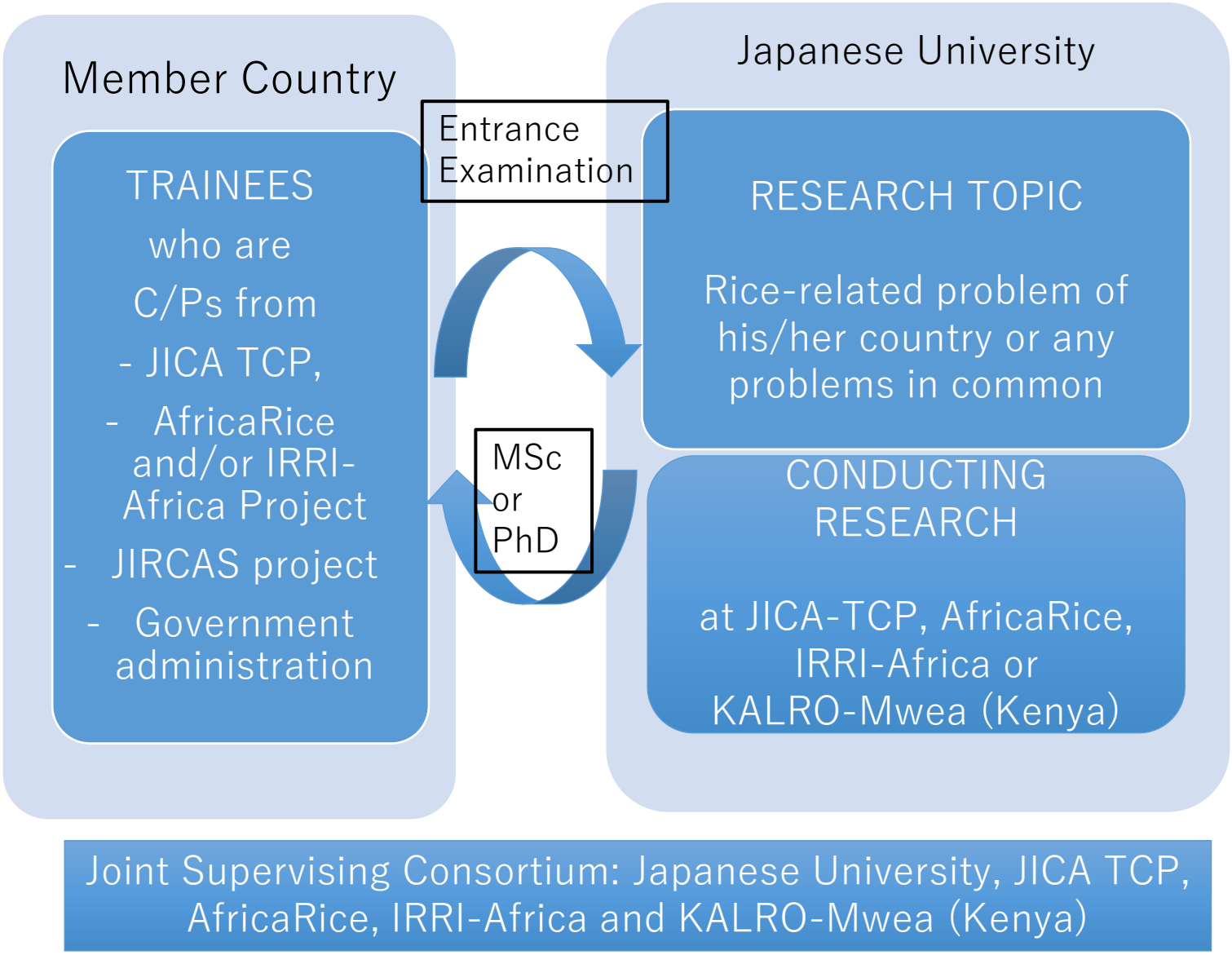
1. Registration to Japanese Universities
2. Conducting research in his/her country under supervision of Japanese supervisor and in collaboration with NARS and JICA TCP
3. KALRO-Mwea as an alternative experimental station, if agreeable (Research facilities including laboratory, experimental paddy fields and human capacity had been established through SATREPS 2013-2017)
4. Possible involvement of IRRI and/or AfricaRice, if agreeable, depending on locality

JICA Short-term Training Course

1 Several courses in Japan, not only for researchers but also for administrators, extension staff, seed technicians

2 Regional training in several African countries, Tanzania, Uganda, Senegal and Egypt which have long been supported by JICA (under negotiation)

Possible Outline of Capacity Development Scheme (MSc & PhD)



Projected human resources for research in Phase 1

(1ST group)

	Researchers (Masters & PhDs)		
	2008	2013	2018
Madagascar	22	48	48
Nigeria	30	40	50
Mali	15	19	24
Guinea	(no data)		
Tanzania	36	40	41
Sierra Leone	18	27	30
Senegal	(no data)		
Ghana	48	55	60
Mozambique	(no data)		
Uganda	10	20	30
Cameroon	12	19	22
Kenya	20	32	56

(NRDS)

(2nd group)

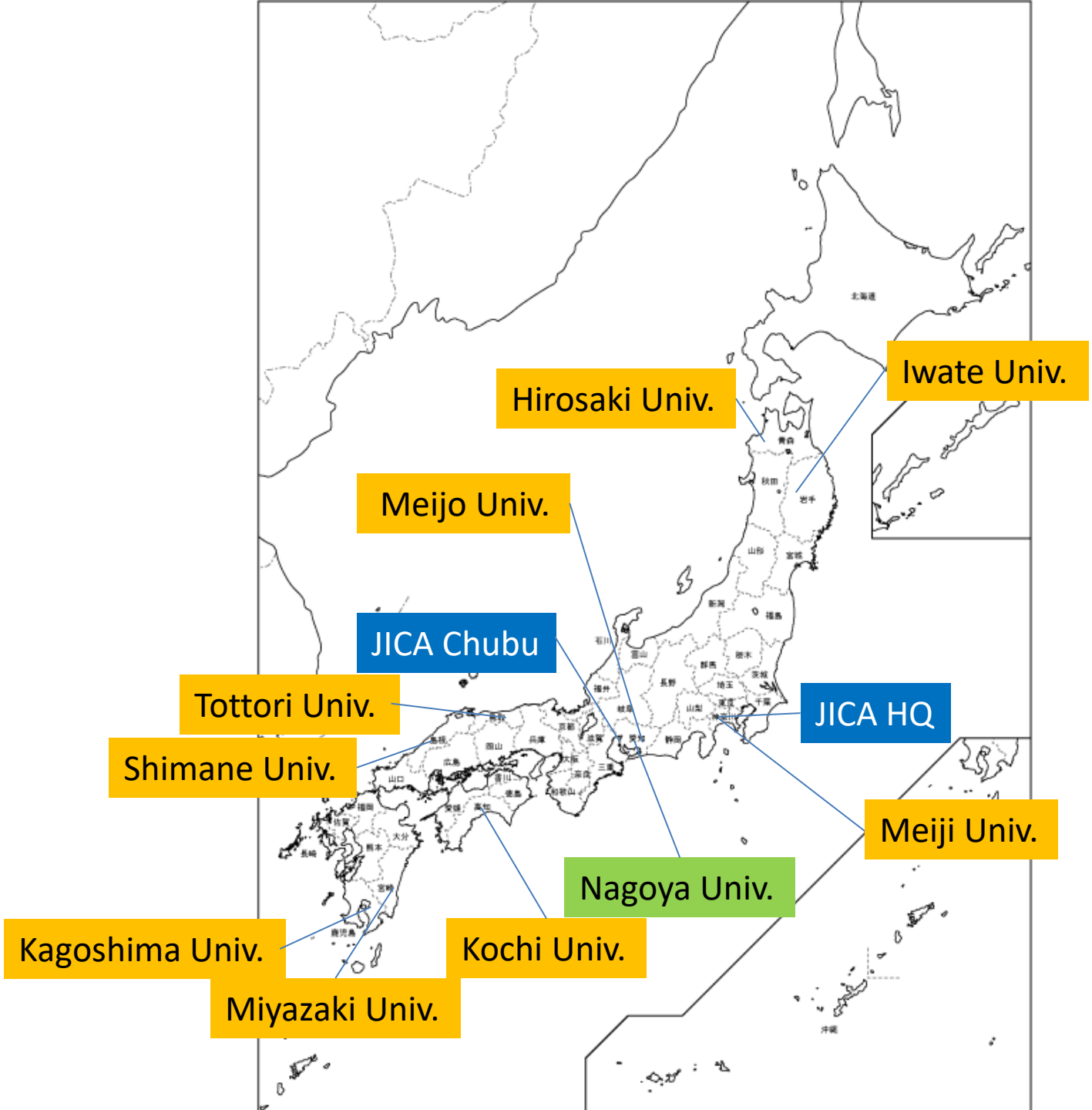
	Researchers (Masters & PhDs)		
	2008	2013	2018
Ivory Coast	(no data)		
DR Congo	(no data)		
Liberia	2	10	11
Ethiopia	23	69	186
Burkina Faso	23	28	32
Benin	20	40	50
Togo	7	13	15
Rwanda	3	9	20
Central Africa	10	15	20
Gambia	14	16	21
Zambia	6	10	15

Trainees participated during 2012-2019

	Country	2012	2013	2014	2015	2016	2017	2018	2019	Total, Country
1	Benin									0
2	Burkina Faso		1	1						2
3	Burundi				1	1		1		3
4	Cameroon	1	1	1					1	4
5	Central Africa									0
6	Cote d'Ivoire		1	1	1					3
7	Congo								1	1
8	DR Congo		1	2	2	2			1	8
9	Ethiopia	1	1	1	1	1	2	1	1	9
10	Gambia									0
11	Ghana	2	1	1		1				5
12	Guinea		1						1	2
13	Guinea Bissau				1					1
14	Kenya	1	1	1		1				4
15	Liberia									0
16	Madagascar						3			3
17	Malawi						1		1	2
18	Mali									0
19	Mozambique	1	1	1		1				4
20	Niger								1	1
21	Nigeria				2	1	1	1	1	6
22	Rwanda								1	1
23	Senegal		1	2			1			4
24	Sierra Leone					3		1	1	5
25	Sudan	1		1	1	1		1		5
26	Uganda	1			1	1	2	1	1	7
27	Tanzania	1	1	1	1	1				5
28	Togo		1	1						2
29	Zambia		1	1	1	1	1	1	1	7
	Total, yearly	9	13	15	12	15	11	7	12	94

24 Countries
94 trainees

(Short-term training course in Japan) :
DEVELOPMENT of CORE AGRICULTURAL RESEARCHERS for PROMOTION of RICE PRODUCTION in SUB-SAHARAN AFRICA (2012----)


Iwate Univ.
Hirosaki Univ.
Meijo Univ.
JICA Chubu
Tottori Univ.
JICA HQ
Shimane Univ.
Meiji Univ.
Nagoya Univ.
Kagoshima Univ.
Kochi Univ.
Miyazaki Univ.

Summary

Integrated approach utilizing various JICA's ODA schemes in collaboration with the other steering committee members for the capacity building of researchers, extension workers and technicians regarding the seed system for rice promotion of CARD member countries

- Technical cooperation project
- Development study program (Msc. and phD)
- Short-term training course
- Grant-aid
- others

Collaboration for sustainable future

CARD Partners

Steering Committee

Development Partners

AfricaRice

IsDB
مجموعة البنك الاسلامي للتنمية
Islamic Development Bank Group

AGRA
Growing Africa's Agriculture

JICA

JIRCAS

Food and Agriculture Organization of the United Nations

FARA

NEPAD

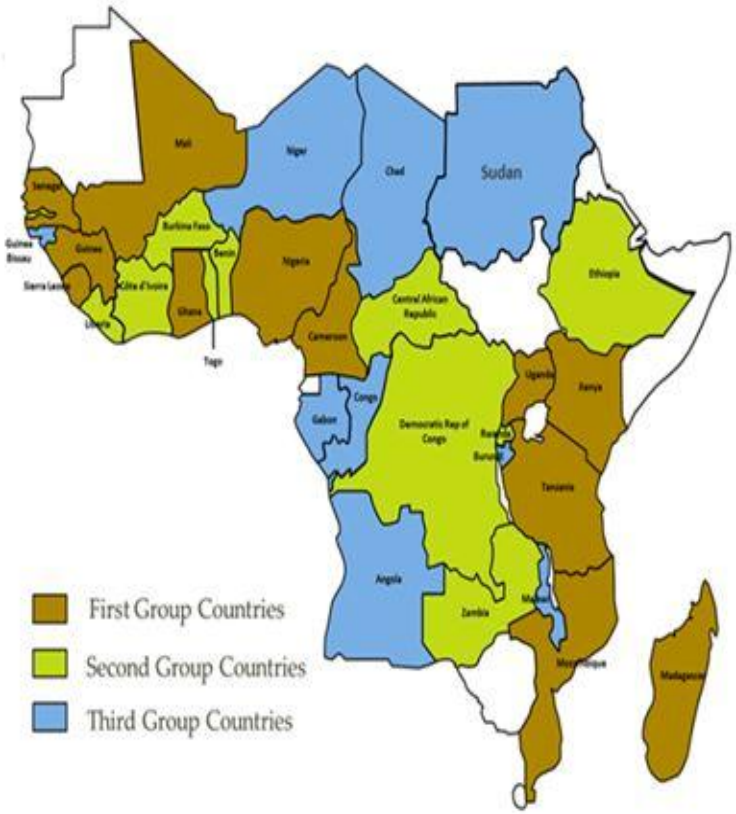
IFAD

THE WORLD BANK
IBRD • IDA

IRRI

WFP
World Food Programme

CARD Member States



Strengthening competitiveness
through better seed system

Sustainable rice production requires human capacity for seed system under continued government support
towards resilient and food secured society

Thank you for your attention