Innovative methods for measuring adoption of agricultural technologies:

Practitioners' Perspectives

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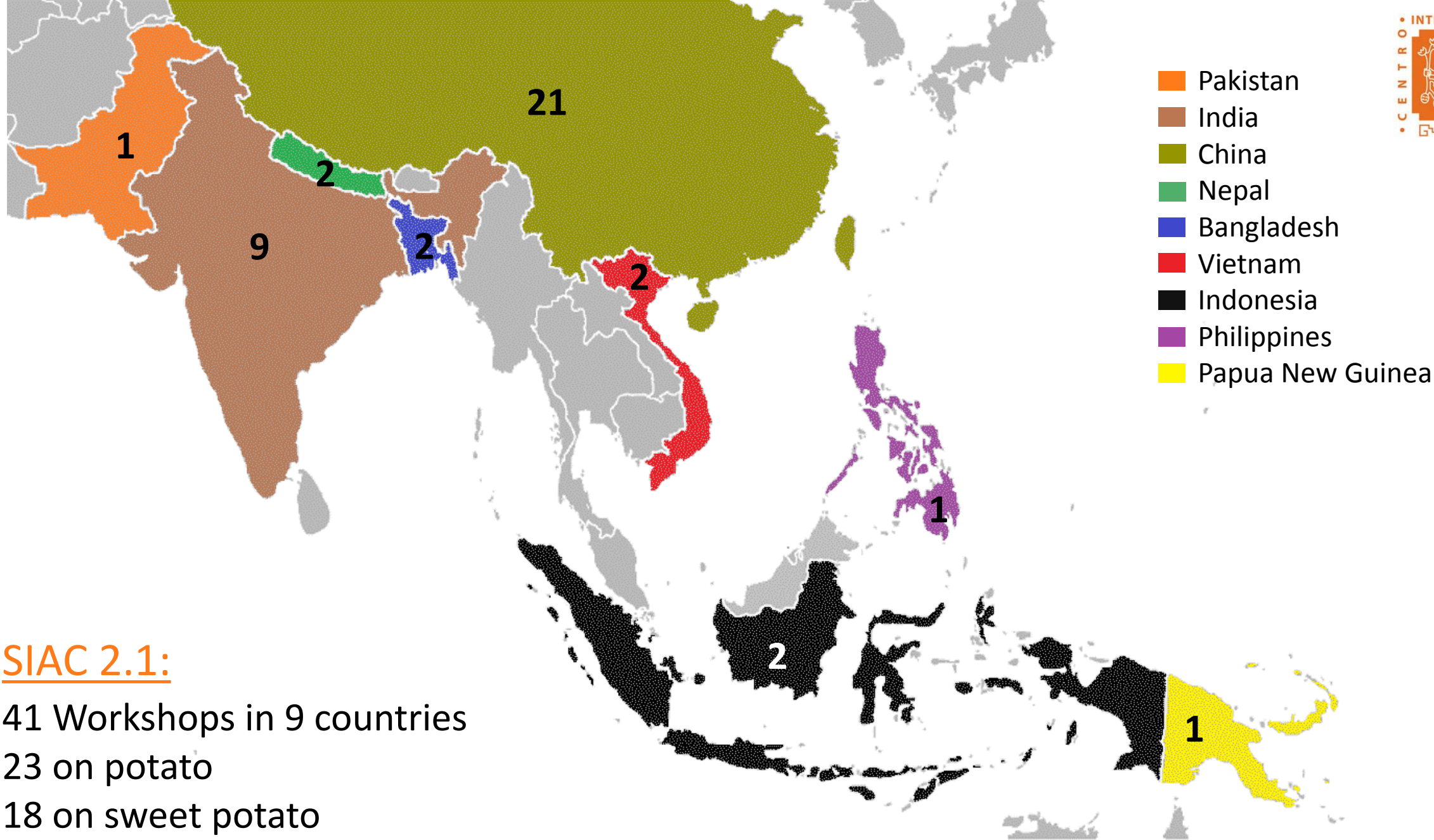m.gatto@cgiar.org

03.08.2016, Boston

Legend:
- Pakistan
- India
- China
- Nepal
- Bangladesh
- Vietnam
- Indonesia
- Philippines
- Papua New Guinea

SIAC 2.1:

41 Workshops in 9 countries

23 on potato

18 on sweet potato

8 facilitators

8 Facilitators:

■ Pakistan (1x)   => Awais Khan

■ India (9x)   => Debdutt Behura, SK Pandey, Marcel

■ China (21x)   => Junhong Qin

■ Nepal (2x)   => Marcel

■ Bangladesh (2x)   => Marcel

■ Indonesia (2x)   => Marcel

■ Philippines (1x)   => Willy Pradel/ Julieta Roa

■ Papua New G. (1x)   => Marcel

■ Vietnam (2x)   => Thuy Cu Thi Le/Marcel

=> Quality of data?

What worked - did not work?

Workshop/Organization:
- Participants showed up (avg 15 per workshop)
- Collaborating with partner institutes
- Sufficient funds (but, differences across workshops)
- One day workshop sufficient to get data needed
- Individual exercise to list varieties good warm up
- Dividing groups purposely or randomly
- Participatory approach well accepted
- 'Instrument' good for individual estimates

Discussion:
- Discussion on agro-ecologies/ total area
- Discussions beyond release and adoption

> ➤ Partnering with institute/people well-established and -connected in sector is key.
> ➤ 8 facilitators for 41 EE workshops! Facilitators need to be well trained on methods.

Group discussion, Punjab, India

What worked - <u>**did not work**</u>?

Workshop/Organization:
- Facilitator not well-connected
- Collaborating with Indian institute (ICAR)
- Participation of female experts and private sector
- Participants left early
- Presentation of experts not always informative
- Missing information due to translation
- Expert clarification after workshop
- Lack of representation of some subdomains
- <u>China:</u> fear to contradict official stats.

Discussion:
- Validation of data in database 1 during workshop
- Equal input during discussions ('elite capture')
- Final plenary discussion of results of subgroups


Discussion on varieties, Indonesia

Mapping exercise, Nepal

Confidence in results depends on…

… **number of experts** who participate

… **'mix' of experts** (but how important is a right 'mix'?)

… **expertise of experts** (how to get the 'right' people to attend?)

… **facilitator**

… **availability of** national (unofficial) **statistics**

… national **documentation capability**

… **group formation** (randomly and purposively)

… **'elite capture'** during discussion

… **method** applied within sub-group (i.e. taking averages, consensus)

How confident are you in results?

High confidence	Low confidence
Higher aggregates	Lower aggregates
Major varieties	Minor varieties
Ratio improved-local vars	Adoption lifecycle
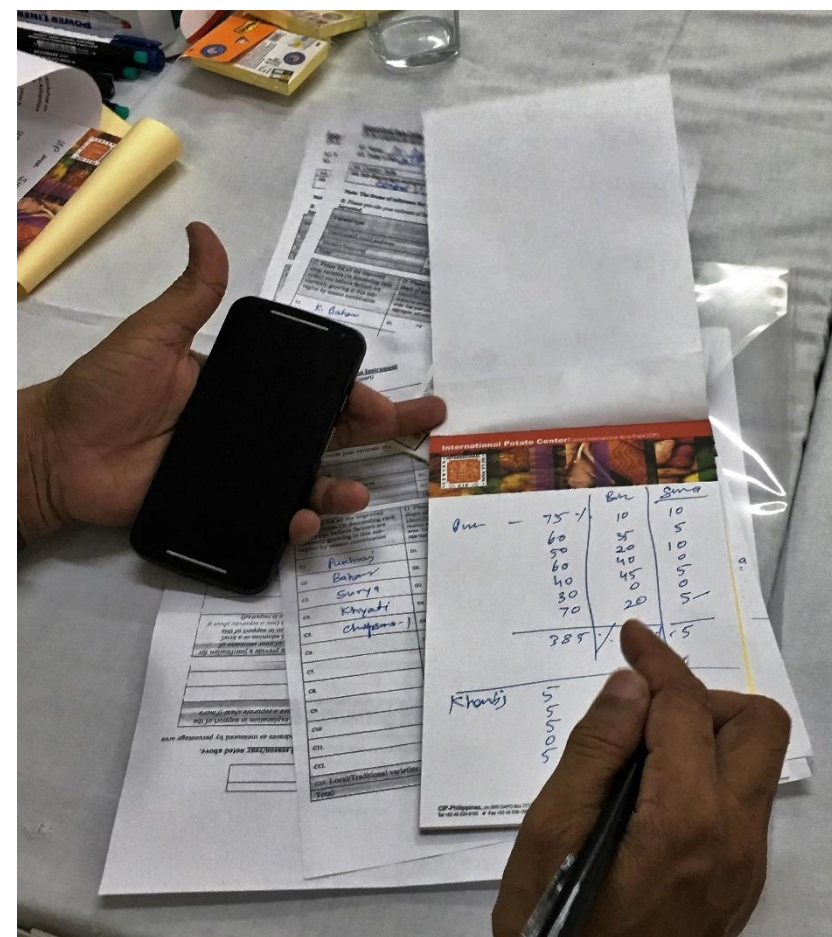
Group estimation (averaging), UP, India

Confidence in results – evidence

1. <u>C88 study, China:</u> HH survey vs. EE very similar results
2. <u>Robustness check</u> during workshop

- During workshop: two groups estimate adoption for same region
- Comparison of results in plenary group: **combined**

- <u>Pro:</u> more confidence
- <u>Con:</u> additional time, expertise of experts

Group estimates potato adoption (%) in Red River Delta in Vietnam

Cultivars	Group 1	Group 2	Combined
	Red River Delta - WINTER		
Solara	40	54.3	40
Chinese Potato	32	4.3	30
Marabel	15	29.6	15.4
Atlantic	5	3.9	5
KT3	3		3
Sinora	3	2.7	3
Bellarosa	1		1
Aladin	1		0.5
Diamant		2.1	0.5
KT1		0.1	0.1
KT2		2.3	1
Jelly		0.7	0.5

Beyond SIAC 2.1?

Good method:

- Provides an alternative to official FAO statistics and challenges these (i.e. PNG)
- Provides data at varietal level which is more useful (for breeders) than national data
- **Positive externalities**:
  - opportunity to meet/connect and discuss about general challenges and opportunities
  - capacity building: establishment of regional and international networks
- Confidence in results likely to increase in a follow-up workshops because experts have started to think about importance and documentation of release and adoption data
- Cross-check database 1 across CCCs by breeder

Expert elicitation of adoption data useful:

- Methods may be used as inexpensive 'rapid release and adoption appraisal'.

India - Punjab

Bangladesh

India – Uttar Pradesh

Nepal

Thank you!

Vietnam

Indonesia

India – Odisha

SWEETPOTATO

Results: Asia

Database 1 - Release

- Document release information: year of release, institutional source, genetic pedigree, resistances, yield estimations, adoption lifecycle...
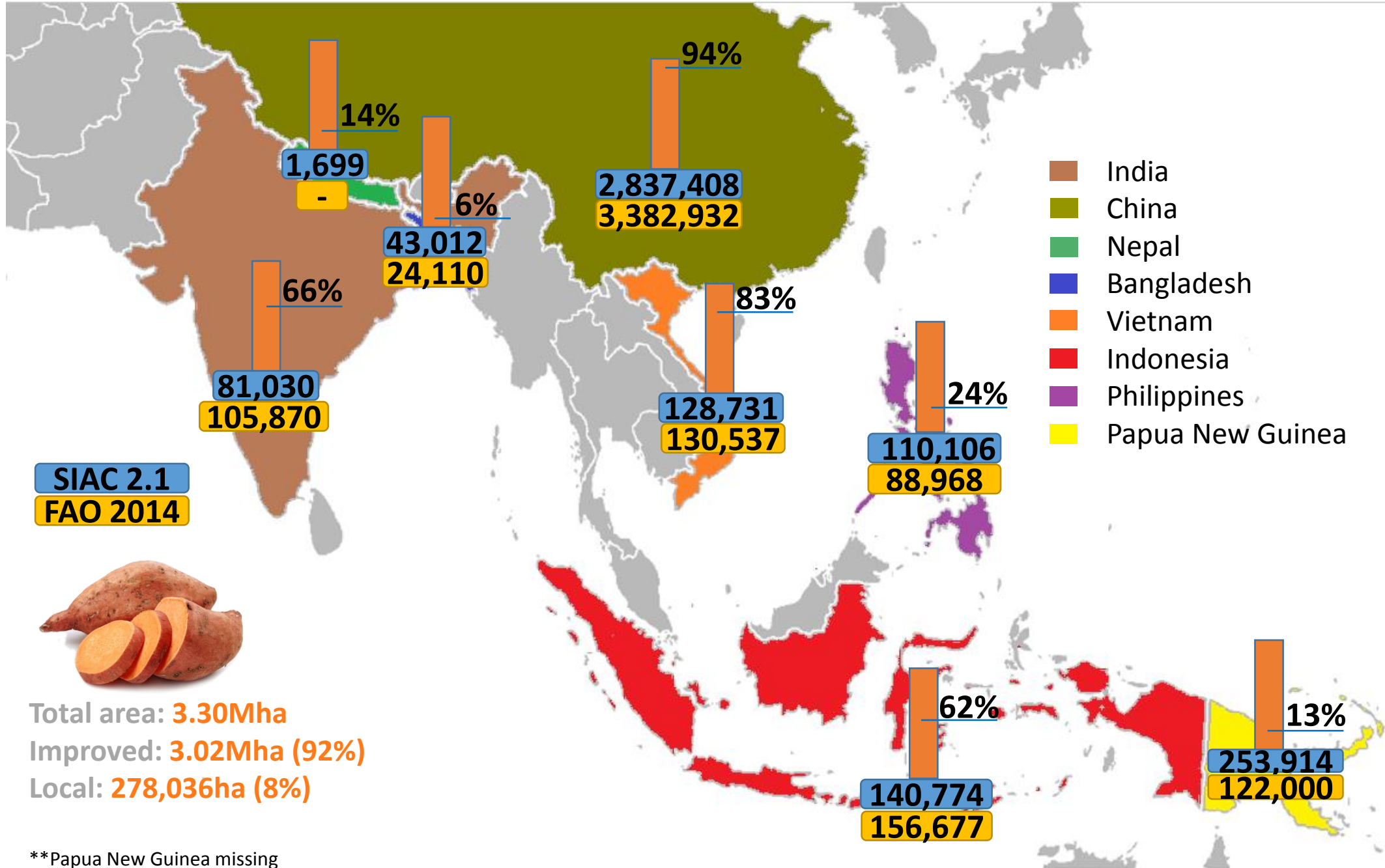
No.	Country/Province	Crop	Official name of the variety	Variety code (ID)	Year of formal release	Year of first use	Institutional source	Genetic background/ pedigree	Type
0	B1	B2	B3A	B3B	B4	B5	B6	B7	
1	INDIA	Sweetpotato	H-41		1971		Central Tuber Crops Research Institute	Norin X Indigenous cultivar	hybrid
2	INDIA	Sweetpotato	H-42		1971		Central Tuber Crops Research Institute	Vella damph X Triumph	hybrid
3	INDIA	Sweetpotato	H-268		1983		Central Tuber Crops Research Institute	(Acc. No. 39 x Acc.No.3)x(Acc.No.1871 x Acc.No.11	hybrid
4	INDIA	Sweetpotato	Sree Nandini	76-OP-217	1987		Central Tuber Crops Research Institute	S-32	open polli
5	INDIA	Sweetpotato	Sree Vardhini	76-OP-219	1987		Central Tuber Crops Research Institute	S-13	open polli
6	INDIA	Sweetpotato	Sree Rethna	X-108-2	1996		Central Tuber Crops Research Institute	S-187 x Sree Vardhini	hybrid
7	INDIA	Sweetpotato	Sree Bhadra	S-1010	1996		Central Tuber Crops Research Institute	seed introduced from Nigeria in 1984	N/A
8	INDIA	Sweetpotato	Gouri	85-15	1998		Central Tuber Crops Research Institute	H-219 x H42	hybrid
9	INDIA	Sweetpotato	Sankar	85-70	1998		Central Tuber Crops Research Institute	H-219 x S-73	hybrid
10	INDIA	Sweetpotato	Sree Arun	RS-III-3	2002		Central Tuber Crops Research Institute	seedling from recurrent selection of seeds of polycr	N/A
11	INDIA	Sweetpotato	Sree Varun	56-2	2002		Central Tuber Crops Research Institute	Seed lot No. CIP 490056 in 1991	N/A
12	INDIA	Sweetpotato	Kalinga	90/704	2004		Central Tuber Crops Research Institute	N/A	open polli
13	INDIA	Sweetpotato	Sree Kanaka	H80/168	2004		Central Tuber Crops Research Institute	S.187 x H.633	hybrid
14	INDIA	Sweetpotato	Goutam	Pol. 21-1	2005		Central Tuber Crops Research Institute	Generated from polycross, Dhenkanal local, a popu	N/A
15	INDIA	Sweetpotato	Sourin	Pol. 4-9	2005		Central Tuber Crops Research Institute	Generated from polycross, the female parent is acc.	N/A
16	INDIA	Sweetpotato	Kishan	Pol. 13-4	2005		Central Tuber Crops Research Institute	Generated from polycross, the female parent is acc. No.1016	
17	INDIA	Sweetpotato	ST 14		not officially released; recommended		Central Tuber Crops Research Institute	Clonal selection from exotic lines	
18	INDIA	Sweetpotato	Samrat	S-30	1987		Central Tuber Crops Research Institute	Clonal selection from the material collected from Darsi, Nellore	
19	INDIA	Sweetpotato	Kanjhangad				Central Tuber Crops Research Institute		
20	Bangladesh	Sweetpotato	Tripti	BARI SP-1	1985		Philippines	Tinirining	

Database 1 – Release II

No	Country	# released Varieties	CIP-related
1	China*	280	18
2	Philippines	31	0
3	Indonesia	24	7
4	Vietnam	24	4
5	India	17	1
6	Bangladesh	13	4
7	Nepal	0	0
8	Papua New-Guinea	0	0/?

*not controlled for duplicates across provinces

Sweetpotato area and share of improved varieties 2014-2016

Legend:
- India
- China
- Nepal
- Bangladesh
- Vietnam
- Indonesia
- Philippines
- Papua New Guinea

14% · 1,699 / –

66% · 81,030 / 105,870

6% · 43,012 / 24,110

94% · 2,837,408 / 3,382,932

83% · 128,731 / 130,537

24% · 110,106 / 88,968

62% · 140,774 / 156,677

13% · 253,914 / 122,000

SIAC 2.1
FAO 2014

Total area: **3.30Mha**
Improved: **3.02Mha (92%)**
Local: **278,036ha (8%)**

**Papua New Guinea missing

Top 10 varieties (by ha) in surveyed countries

No	Variety Name	Area (ha)	Year of Release	Country	CIP-related	Share of Total Area(%)
1	Shangshu 19	451,436	2003	China	No	15.9
2	Xushu 18	244,423	1976	China	No	8.6
3	Chaoshu No.1	236,145	1990	China	No	8.3
4	Nanshu 88	228,841	1988	China	No	8.1
5	Xushu 22	97,733	2003	China	No	3.4
6	Guishu No.2	80,000	1994	China	No	2.8
7	Suyu No.1	77,333	1978	China	No	2.7
8	Jishu No.21	64,533	2007	China	Yes	2.3
9	E-sweetpotato No.6	56,000	2008	China	No	2.0
10	Sushu No.8	49,967	1998	China	No	1.8

- **The most important variety is Shangshu 19 covering** 15.9% of the total area

- **The 10 most important varieties are all released** in China

- **The 10 most important varieties cover** 56% of the total area

- Jishu No 21 is **CIP-related**

Results: Indonesia

Sweetpotato area (ha) and share of improved varieties 2015 - Indonesia

Legend:
- Sumatra
- Java
- Sulawesi
- Nusa Tengga Timur
- Papua

80% 32,300 (Sumatra)
83% 50,675 (Java)
90% 14,260 (Sulawesi)
1% 9,418 (Nusa Tengga Timur)
20% 34,121 (Papua)

Total area: **140,774ha**
Improved: **87,652ha (62%)**
Local: **53,121ha (38%)**
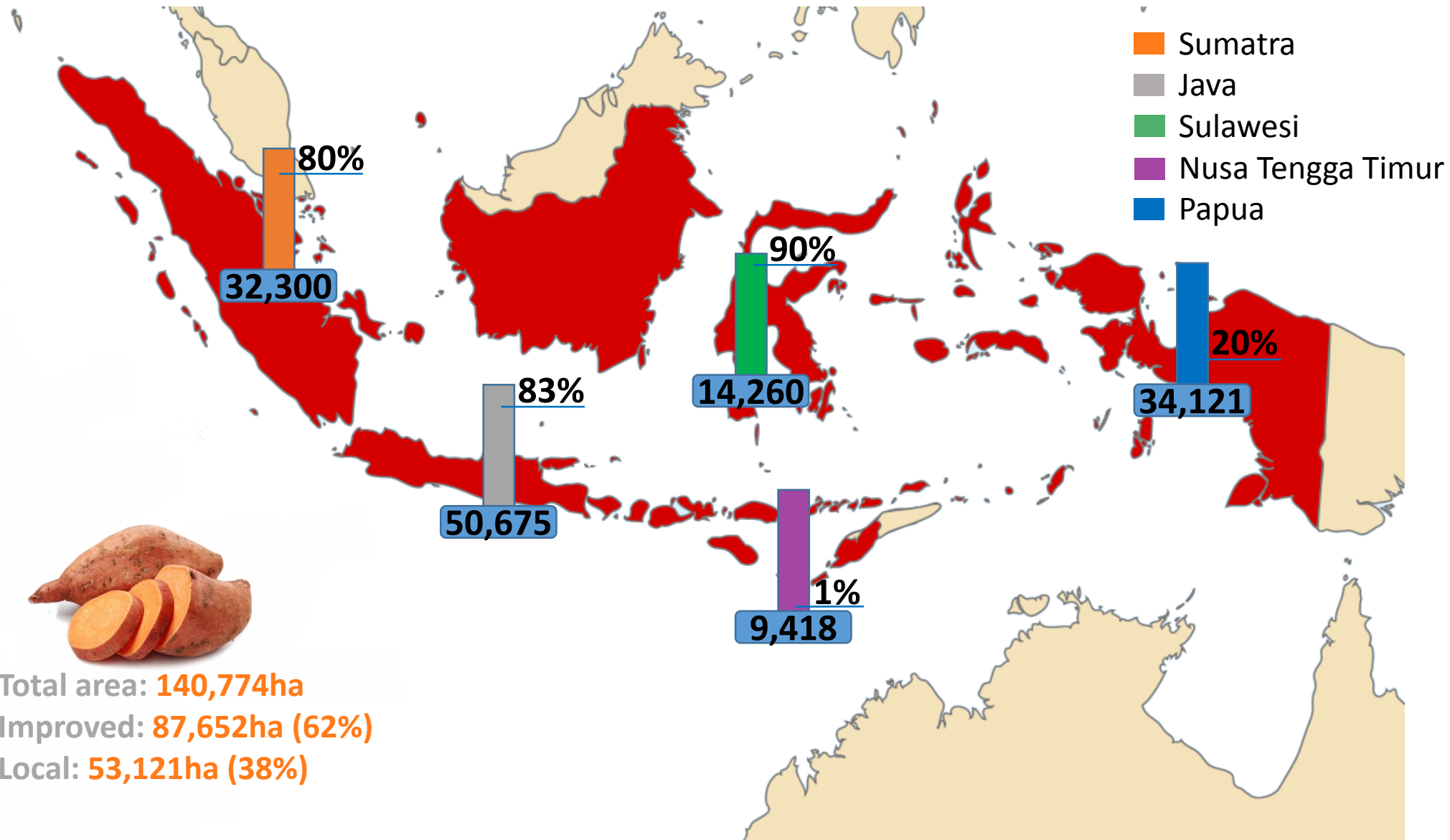
Sweetpotato area (ha) by season in 2015 - Indonesia

Legend:
- Sumatra
- Java
- Sulawesi
- Nusa Tengga Timur
- Papua

Sumatra: Rainy 24,225 — Dry 8,075
Java: Rainy 50,675
Sulawesi: Rainy 10,695 — Dry 3,565
Nusa Tengga Timur: Rainy 9,418
Papua: Rainy 34,121
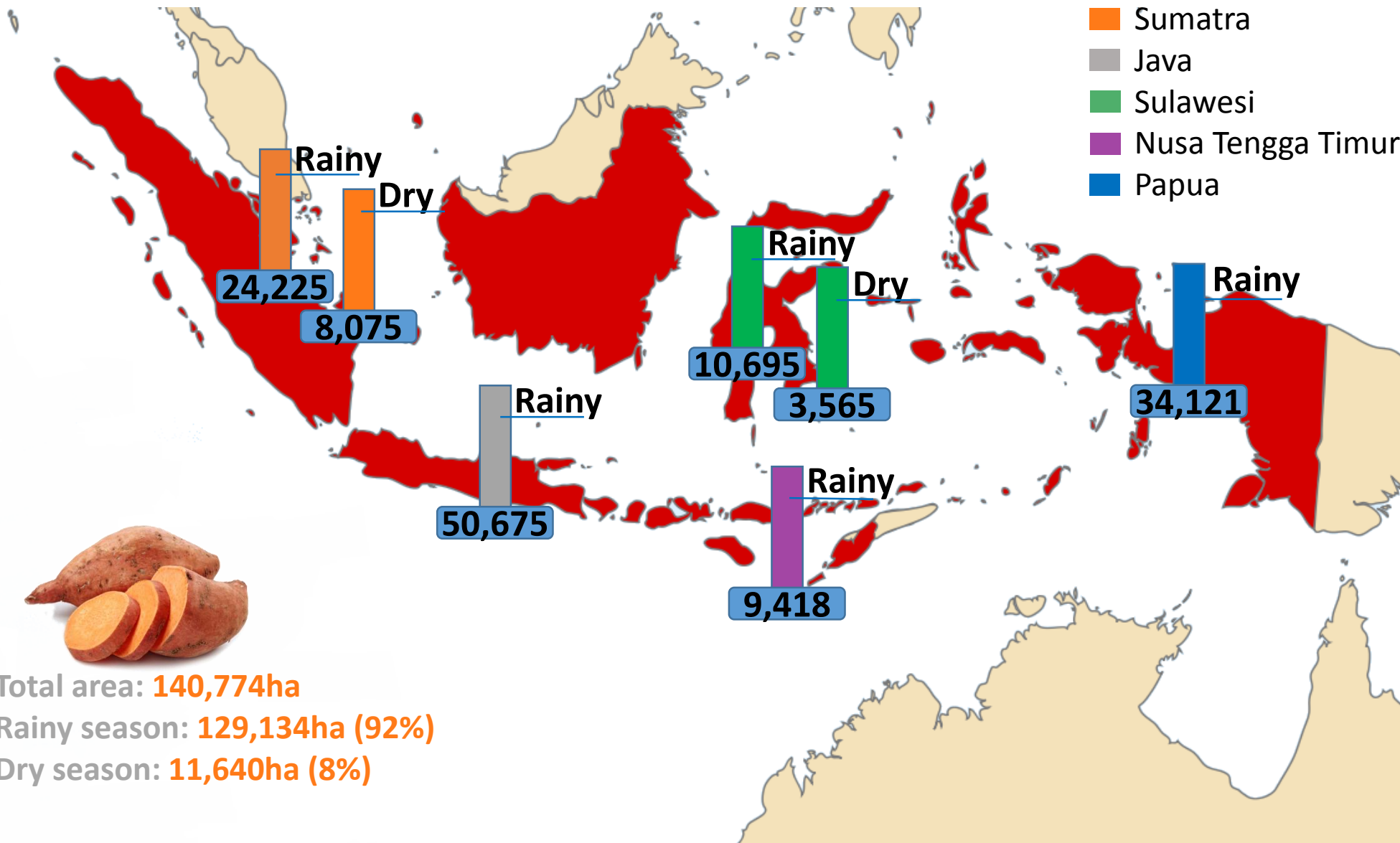
Total area: **140,774ha**
Rainy season: **129,134ha (92%)**
Dry season: **11,640ha (8%)**

Top 10 varieties (by ha) in Indonesia

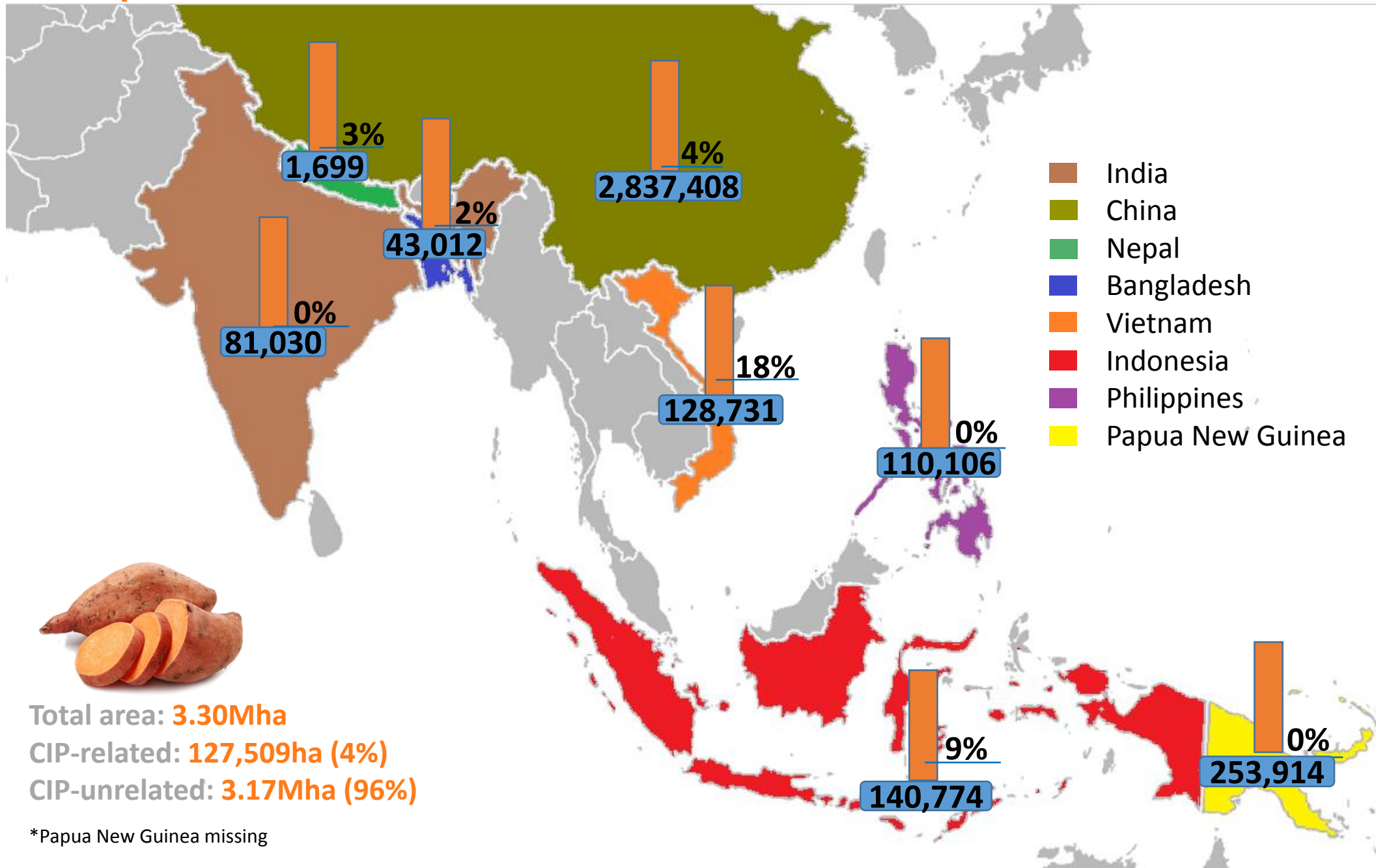| No	Variety Name	Area (ha)	Year of Release	Country	Share of Total Area
1	Cilembu Rancing	20,047	2001	Indonesia	0.14
2	Helaleke (local)	10,236	N/A	N/A	0.07
3	Kuningan Putih	10,135	N/A	N/A	0.07
4	Ayamurasaki	8,297	N/A	Japan	0.06
5	Benindo	8,075	?	?	0.06
6	Musan (local)	6,824	N/A	N/A	0.05
7	Antin 3	6,460	2014	RILET	0.05
8	Beta 2	5,564	2009	CIP	0.04
9	Antin 2	5,257	2014	RILET	0.04
10	Antin 1	5,067	2013	RILET	0.04

- **The most important variety is Cilembu Rancing covering** 14% of the total area

- **10 most important varieties cover** 62% of the total area

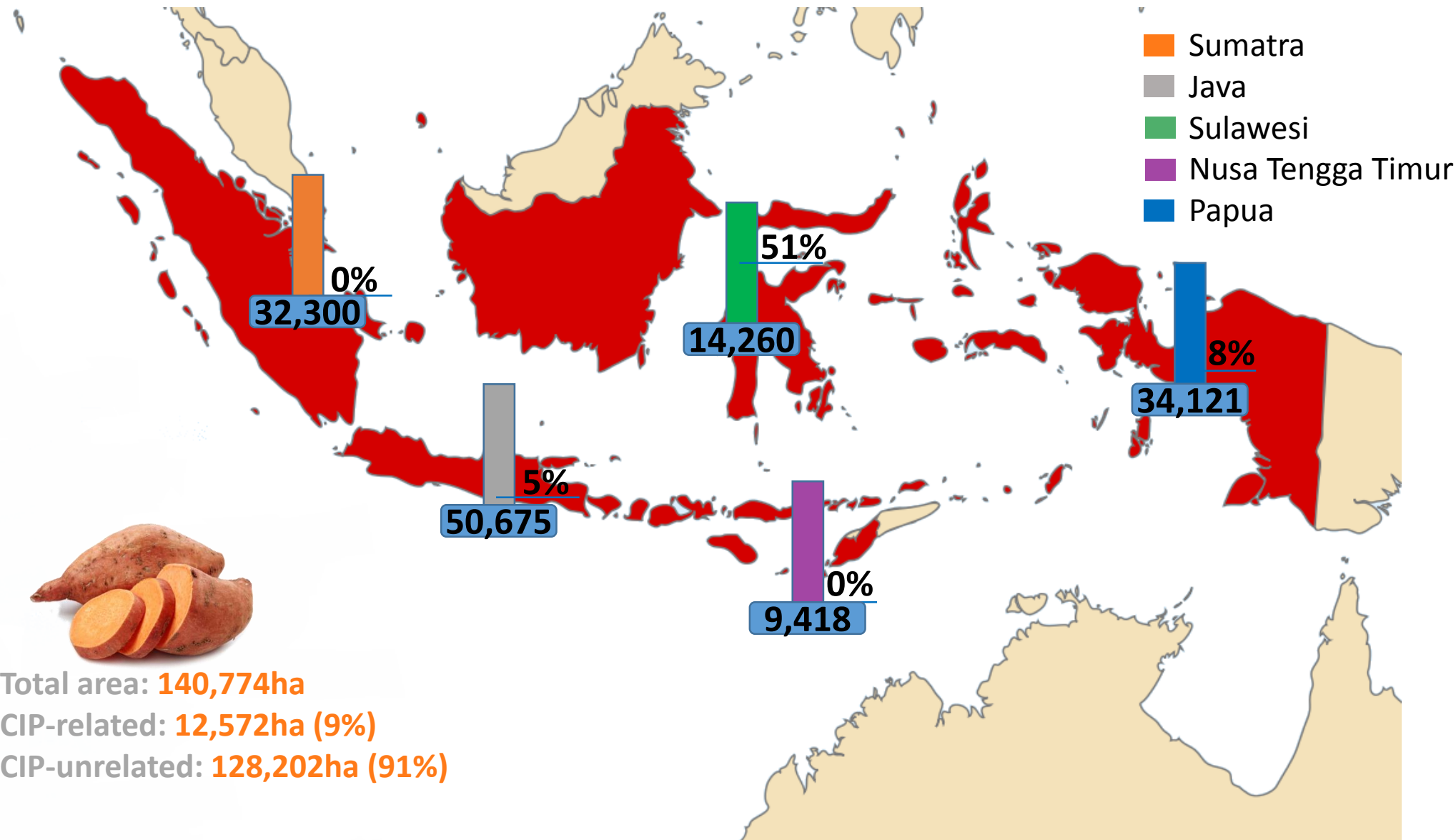- **Beta 2 is CIP-related** covering 4% of total area

'CIP-related' varieties

Sweetpotato area and share of CIP-related varieties 2014-2016

3%
1,699

4%
2,837,408

2%
43,012

0%
81,030

18%
128,731

0%
110,106

9%
140,774

0%
253,914

Legend:
- India
- China
- Nepal
- Bangladesh
- Vietnam
- Indonesia
- Philippines
- Papua New Guinea

Total area: 3.30Mha
CIP-related: 127,509ha (4%)
CIP-unrelated: 3.17Mha (96%)

*Papua New Guinea missing

Sweetpotato area (ha) and share of CIP-related varieties in 2015 - Indonesia

Legend:
- Sumatra
- Java
- Sulawesi
- Nusa Tengga Timur
- Papua

0% — 32,300
51% — 14,260
8% — 34,121
5% — 50,675
0% — 9,418

Total area: **140,774ha**
CIP-related: **12,572ha (9%)**
CIP-unrelated: **128,202ha (91%)**

Top 10 CIP-related varieties (by ha) in surveyed countries in 2015

No	Variety Name	Area (ha)	Year of Release	Country	Share of 'CIP-area'
1	Jishu No.21	64,533	1976	China	0.51
2	Xichengshu 007	14,218	2008	China	0.11
3	K51	9,551	2000	Vietnam	0.07
4	Luoshu No.10	7,367	2015	China	0.06
5	Jizishu No.1	5,867	2012	China	0.05
6	Shangshu No.9	5,633	2013	China	0.05
7	Beta 2	5,564	2009	Indonesia	0.04
8	KL5	5,304	1999	Vietnam	0.04
9	SO8	4,580	1989	Vietnam	0.04
10	KLC266	3,760	2011	Vietnam	0.03

- **The most important CIP-related variety is Jishu No.21 covering** 51% of the 'CIP-area'

- **10 most important CIP-related varieties cover** 95% of the 'CIP-area'