Uprooting Rice Science to building a research community: Research policy challenges and prospects of SRI in India

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Outline

- Chronology of the SRI controversy
  - Missing Indian perspectives
- Building a research network
  - India and the world in SRI
  - Where do Indian researchers publish
  - Which states are these articles from
  - Which institutions
- Some conclusions

Understanding SRI… a journey

- SRI as a case study on rural innovation and science learning from civil society.
- Right time and place…buzz about SRI in India and AP, International Year of Rice (2004), debate framed “hope or hype”, “feast or famine”…
- “Understanding scientific controversies: Case of SRI” Feb 2005… can’t be resolved through one time field experiments or assessments, not just what it is, but what it means or represents for diverse interest groups…
- ……Revisiting the controversy……

Rice Wars

- *Nature* March 25, 2004.
  - IRRI scientists– SRI anecdotes, no peer review. Exceeds theoretical limit. longer to mature.
  - SRI matures earlier, farmers experience Vs sceptical scientists. Not a miracle but scientifically explainable. **I hope that the scientific community will collaborate in verifying these facts.** (Alapati Saytanarayana)
- Uphoff – Sinclair debate *Rice Today* July – Sept Sinclair – **Agronomic UFOs waste valuable scientific resources** "Discussion of SRI is unfortunate because it implies SRI merits serious consideration…. A multinational team has shown… SRI has no yield advantage"

Rice an Aquatic Plant?

Raju and 150 tillers!!

The Mustikovila story

- 500 acres of paddy in Mustikovila tank irrigated area saved in drought due to extrapolation of SRI principles and inputs from Timbaktu and Narayana Reddy.
- The focus is not yield based but using SRI to reestablish farmers control over production instead of dependence. SRI as a means to greater food self-sufficiency and resource conservation .

The chronology of controversy

- Early phase 1999-2003…(SRI beginning to attract notice…)
- Rice Wars (2004-2008)
- Socially constructed controversies… (2009….)
- Alternative science of SRI, the next generation of researchers
  - Science from Margins, Creative dissenters… ignored by rice scientists

Round 1: The Battleground (Agricultural Systems)

- Stoop, Kassam, Uphoff (2002) (sent in 2000 Aug, accepted April 01) "review of agricultural research issues SRI in Madagascar".. "rice need not perform best under flooded conditions", "traditional and knowledge-intensive paradigms", interactions, synergies not understood…."research scientists to be more field oriented", economic assessments before fully understood misleading, SRI will not be applicable invariably everywhere
- Doberman (2004) "A critical assessment of SRI", (recd Sept' 02, accepted June 03), SRI not necessary to grow to yield potential, deep roots yield low, not representative of most rice environments in Asia.. Perhaps in some niches, yield ceilings…..
- Moser, Barrett (2003) "Disappointing adoption dynamics".. Inequitable distribution, high cost of diffusion

….. The actual battle is beyond the journals……

ASSESSMENTS OF THE SYSTEM OF RICE INTENSIFICATION (SRI)

Proceedings of an International Conference held in Sanya, China, April 1-4, 2002

Organized by
Cornell International Institute for Food, Agriculture and Development
China National Hybrid Rice Research and Development Center

Co-sponsored by
Association Tefy Saina, Madagascar
China National Rice Research Institute

Edited by
Norman Uphoff and Erick C. M. Fernandes
Cornell International Institute for Food, Agriculture and Development
Yuan Longping and Peng Jiming
China National Hybrid Rice Research and Development Center
Sebastien Rafaralahy and Justin Rabenandrasana
Association Tefy Saina, Madagascar

SRI networks Mobilizing beyond Madagascar

news feature

The rice squad

Feeding the world in the twenty-first century could require a second green revolution. But that may involve the most audacious feat of genetic engineering yet attempted, says Christopher Surridge.

Could a simple genetic switch make rice capable of meeting the world's food needs?

Sowing the seeds: the International Rice Research Institute is backing the effort to boost rice yields.

IRRI and C4 investments

Hostile Round 2 in FCR

- Fantastic yields in the SRI: fact or fallacy? (Sheehy et al, 2004)… (recd 12 Nov, accepted 19 Dec)
- Agronomic UFOs, Sinclair Cassman (2003)…(recd 18 Dec, accepted 29 Dec…)
- Curiosities, nonsense, non-science and SRI (Sheehy et al, 2005) accepted in a week!
- The SRI controversy: a response (Stoop, Kassam, 2005)… recd 2 May, accepted 29 July…
- Does SRI outperform conventional Best Management Practices (Mcdonald et al, 2006).. Accepted in 10 days
- Critical assessment of desk study comparing SRI and BMP (Uphoff, Stoop, Kassam, 2008), 6 month in review..
- Stubborn Fact: Still no evidence…SRI vs BMP (Mcdonald et al, 2008)…4 months acceptance..

……. Clear Asymmetry in debate, surprisingly high rhetoric in a scientific journal of standing

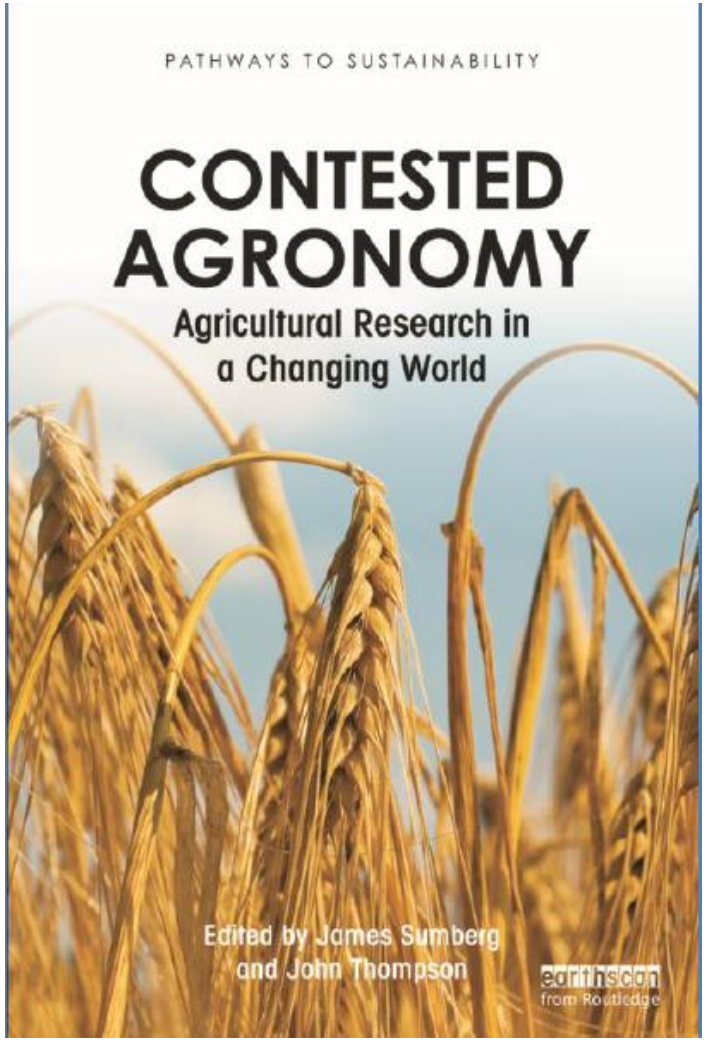
Controversies and Closure…

"I simply do not have the time to be engaged on the issue of SRI. At the end of the day, I suspect the only way to resolve our different viewpoints would be to have both of us live in a village in Tamil Nadu where we could be directly involved with the field research comparing the SRI approach with the best conventional recommended practices for irrigated lowland rice. I am positive that after such a stint, the two of us would no longer have different viewpoints about the relative merits of the two approaches." Kenneth Cassman, email to Uphoff , 10-Jun-05

- Few scientific controversies have ended thus…Also signs of disinterest from some of the actors… or wearing down the opponent..

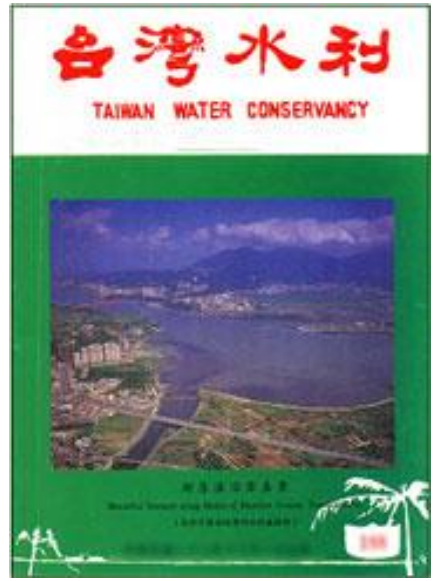
Round 3: Failed mediation by Gates Foundation

- Cornell and IRRI agree to do an agronomic assessment with Wageningen, Gates shows interest (2006-08)
- Gates Foundation scales down, Wageningen manages to convert to a socio-technical study
- New round of 'socially constructed controversies" in social science journals NJAS
  - SRI is not merely a set of crop management principles but the product of a distinctive socio-technical system that has operated, at least partly, outside the mainstream circuits of international agricultural research.
  - The Achilles heel of the arguments for taking SRI seriously.. Dearth of high-quality, peer-reviewed studies that could provide sufficient empirical evidence to convince the sceptics …
- Priority dispute… "creation myth" of SRI "artistic license"…"discovery or invention"…..
- Sumberg – Kassam debate…..



There is life (and science) beyond (some) journals

- Technical debate is ‘dead’,
- New insights from the margins…
- The location changes to China, India (40-80 %)….and other journals



http://sri.ciifad.cornell.edu/research/JournalArticles.html

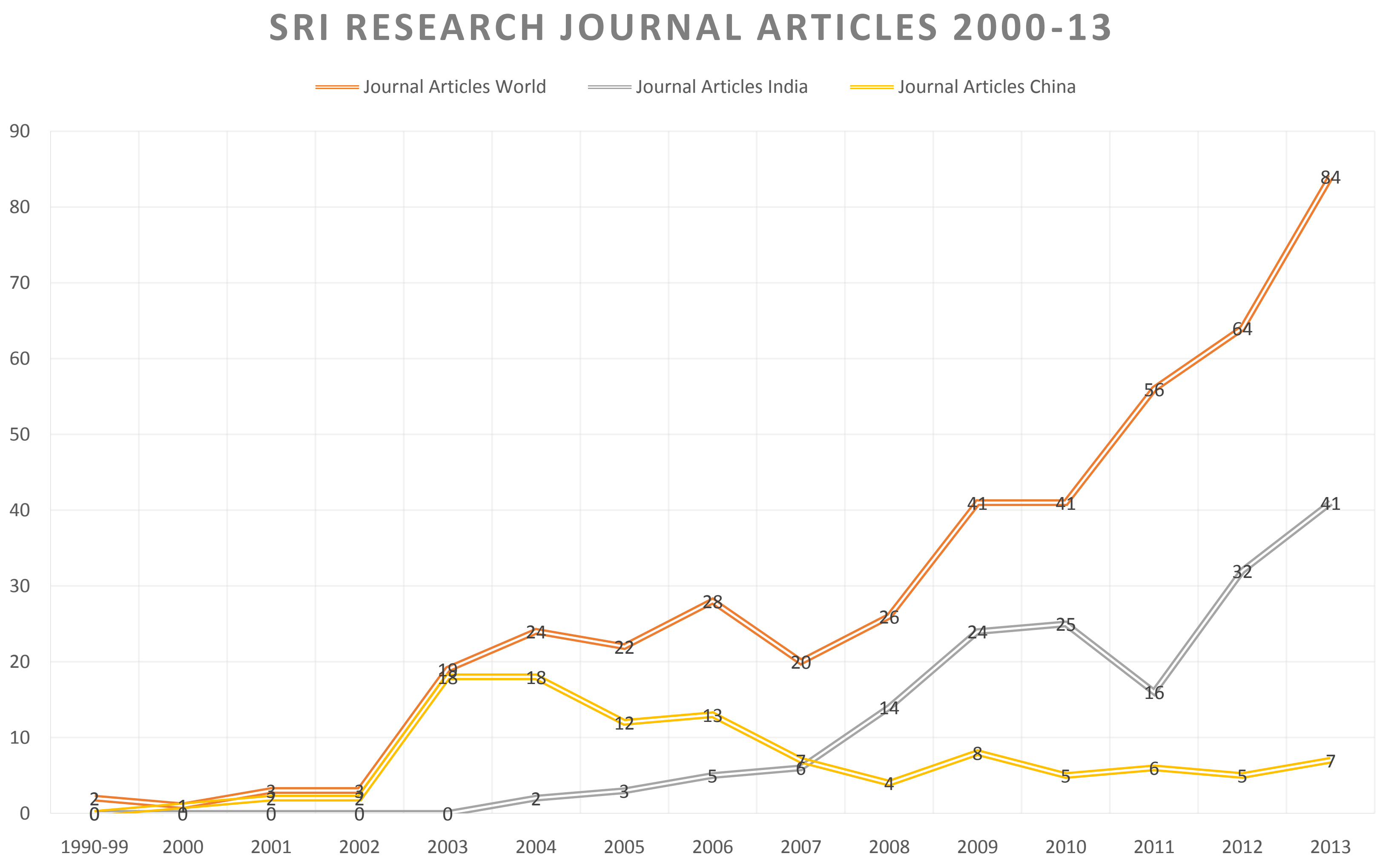
BUILDING A RESEARCH NETWORK:
AN ANALYSIS OF JOURNAL ARTICLES ON SRI IN INDIA

Indian science policy… and practice

- Positioning India among top 5 global scientific powers by 2020.
  - Global share of publications to double, top 1% to quadruple, citation to reach world average (STIP 2013)…
- No Indian university / institution in 'top 200' of ranking…PM Singh..
- Science Under Siege: DTE Oct 2013
  - *"Agricultural research has ossified in India"…. "nothing of significance has emerged from this system to galvanise farming in recent decades"*

Is there something for Indian science to learn from the margins? From SRI?....

2.1 India leading SRI research Globally



Overall > 38 % of all Journal articles from India

China and India contribute over 63% of all papers

China early lead until 2006

No journal articles from India until 2004

India dominates since 2007 (30 -60% overall)

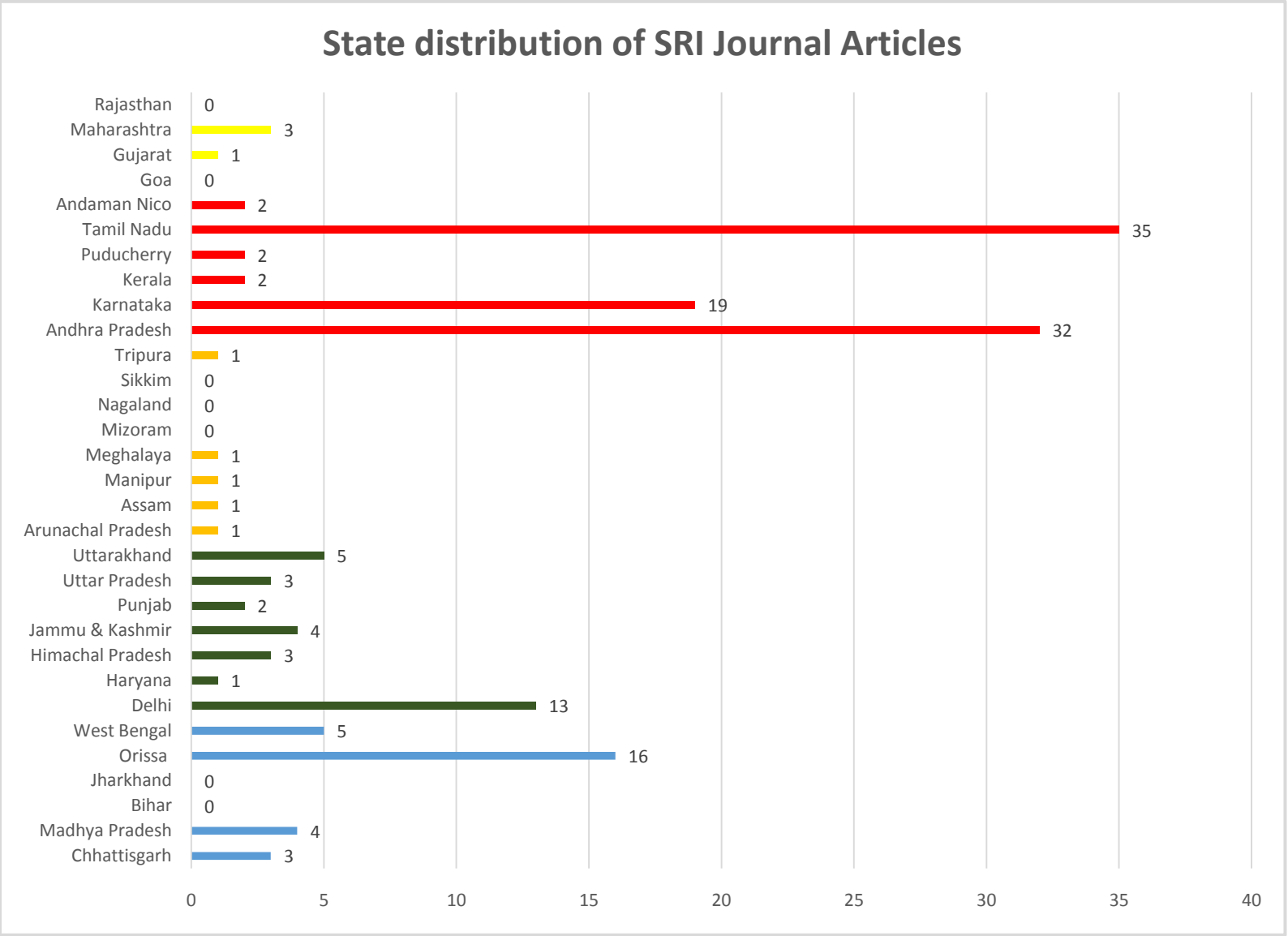
2.2 Where do researchers publish in an emerging and 'unofficial' field

- Widely spaced or spread… inevitable in a new field
- SRI research (> 400 papers) published in 196 journals
  - Paddy Water Env, Hybrid Rice, FCR, Chinese Jl of Rice Science, Indian Jl of Agronomy, Agricultural Systems, Jl of Crop & Weed, Exptl Agri,
- 168 Indian SRI Papers in 70 journals, 33 from India (half of total papers)
  - Paddy and Water Environment (12), Indian Journal of Agronomy (9), The Madras Agricultural Journal (9), Karnataka Journal of Agricultural Science (9), ORYZA- An International Journal on Rice (8), Agricultural Economics Research Review (7), Indian Journal of Agricultural Research (6), Journal of Crop and Weed (5), Experimental Agriculture (4), Environment and Ecology (3)
- *Implications for research…next phase?*

Journals – Quality Vs Relevance?!

- Rating systems are better used in national institutional contexts
  - Indian NARS – one of the largest public funded research (93% state funded), 97 ICAR institutes, 58 state univs, … SCI does not capture all…
- NAAS 2014 ratings of journals
  - > 50 journals have ratings in 2013 or 2014
- 65 papers had a NAAS rating of over 4,
- 35 above 5 suggesting “good” publication record or quality
  - *Development, Plant and Soil, Agricultural Systems, Irrigation Science, Food Policy, Agricultural Water Management, Journal of Agronomy and Crop Science, International Journal of Agricultural Sustainability, World Journal of Microbiology and Biotechnology, Experimental Agriculture, Paddy and Water Environment, Current science, International Journal of Water Resources Development (all above 7.0)*

2.3 Distribution of SRI research state-wise India



Central & Eastern Region little research except for **Odisha**

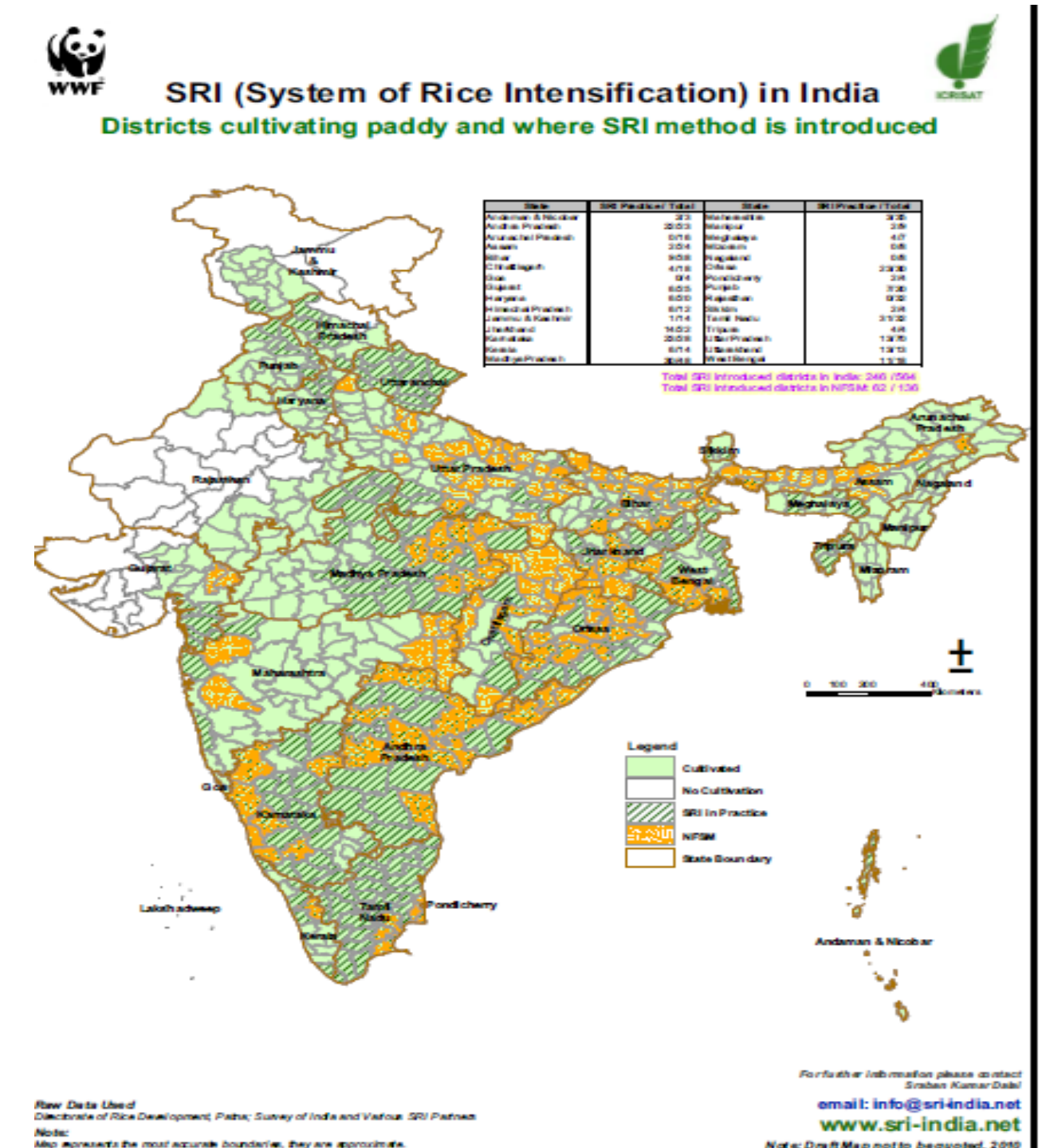
North and west except for **Delhi**

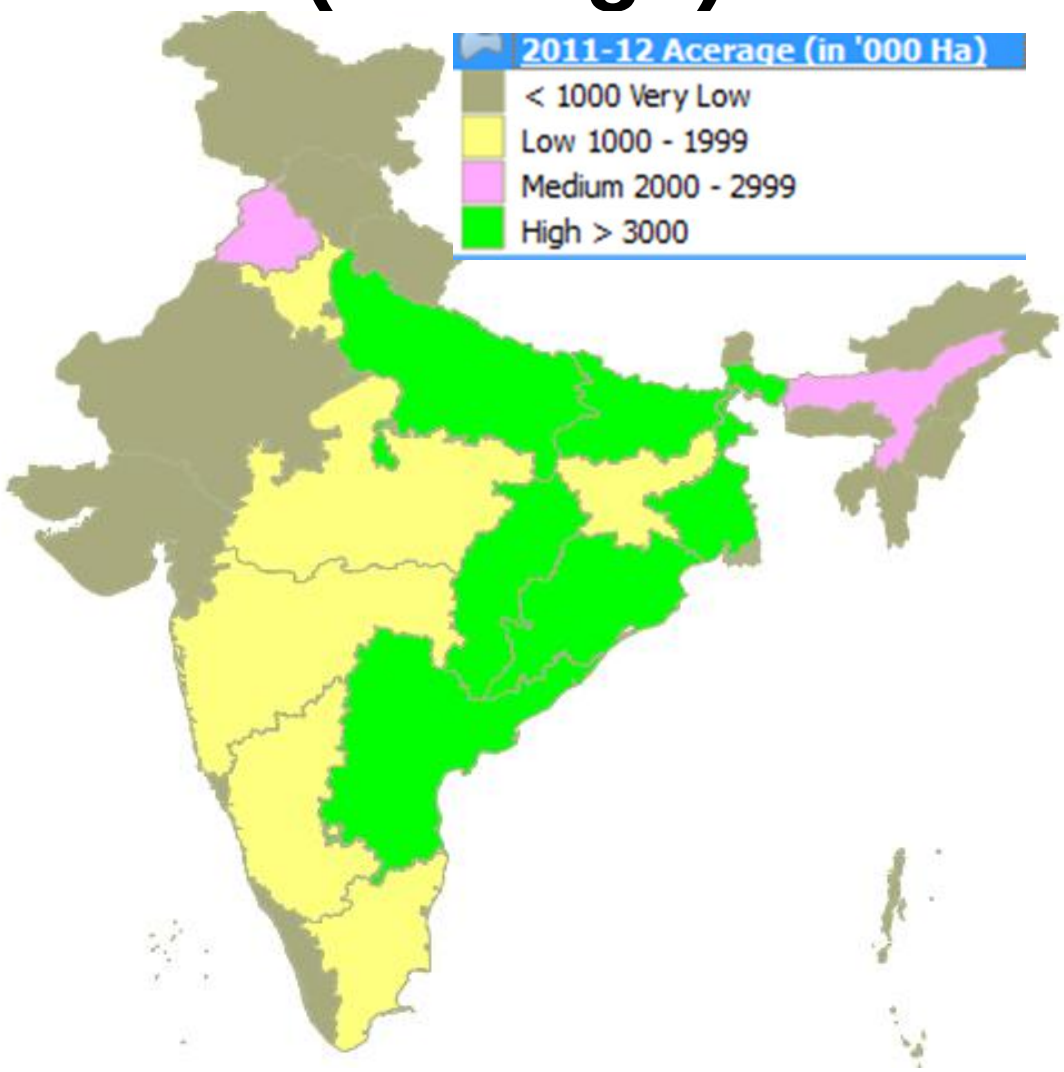
North East more scope for research

South well represented but for Kerala

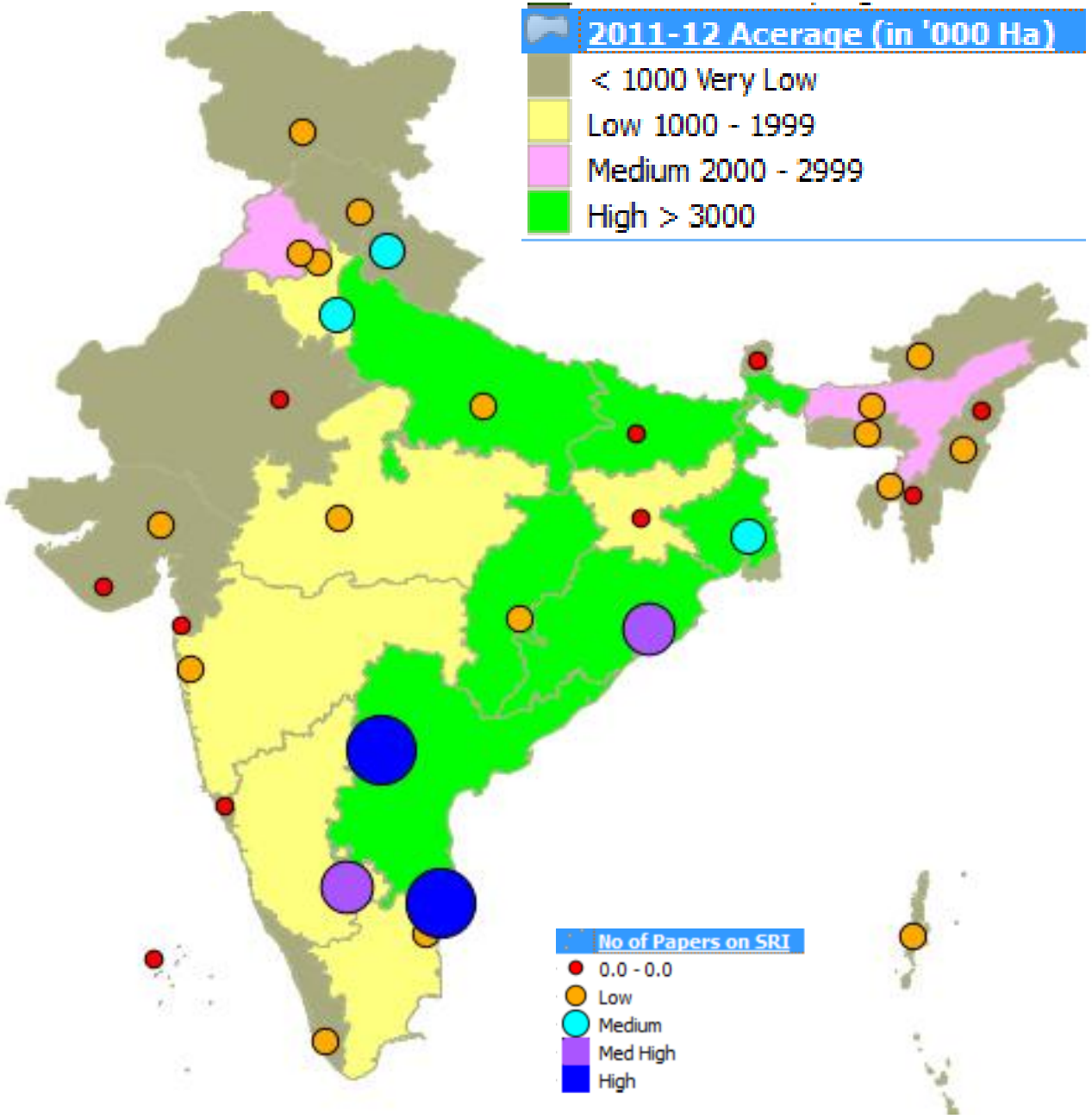
Western India more scope….

GIS Maps 2010 (SRI-NFSM) & 2012 (acreage)





GIS Map of Indian SRI Research



Notable omissions no research from Bihar or Jharkhand

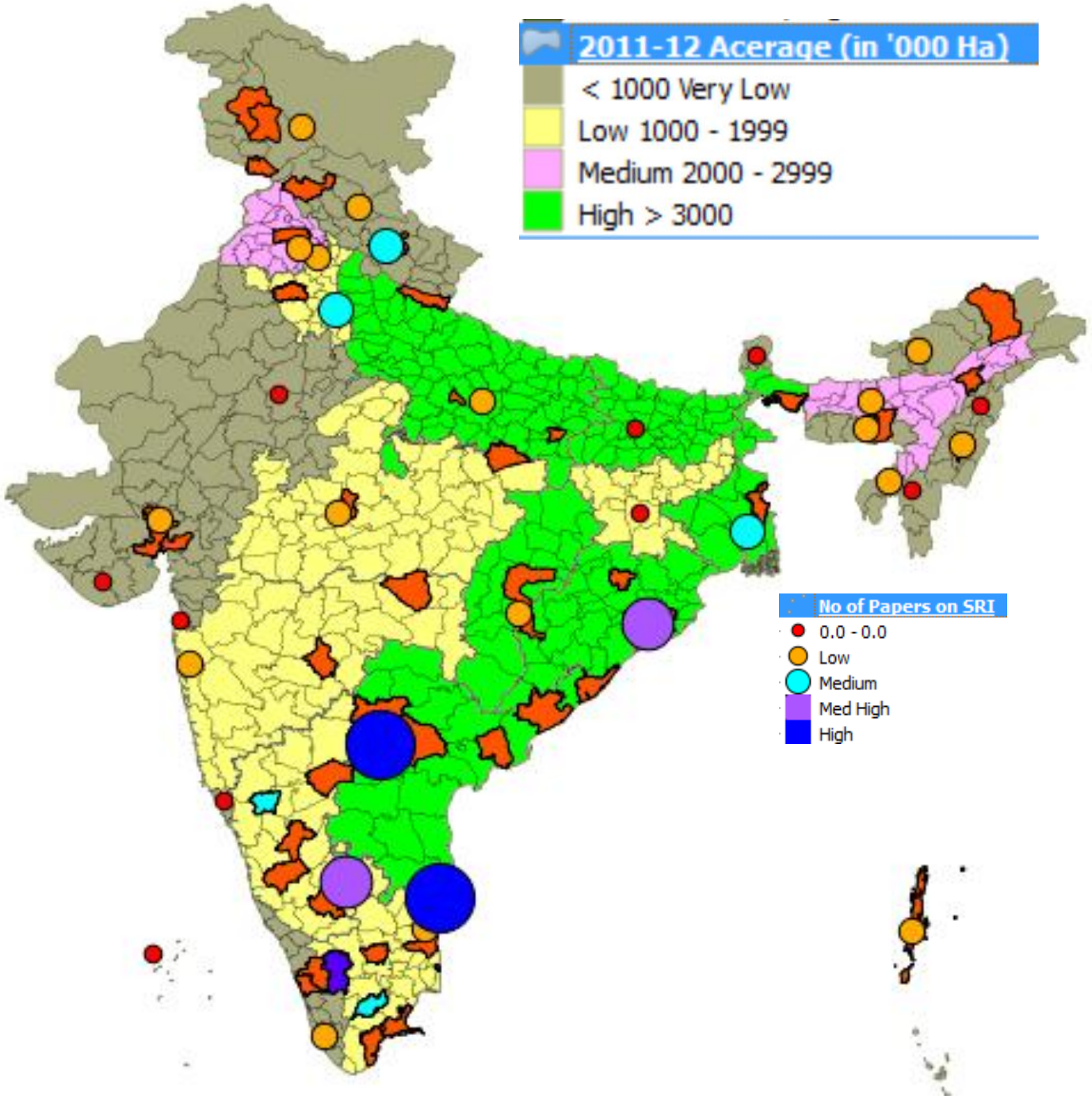
Very low from key rice growing areas –
UP, Chattisgarh, Punjab, Assam…..

Regional inequalities persist…
Odisha a 'desirable deviant'

8 papers on India by researchers outside India

Notably none by IRRI researchers

GIS Map Indian SRI Research – state and District spread



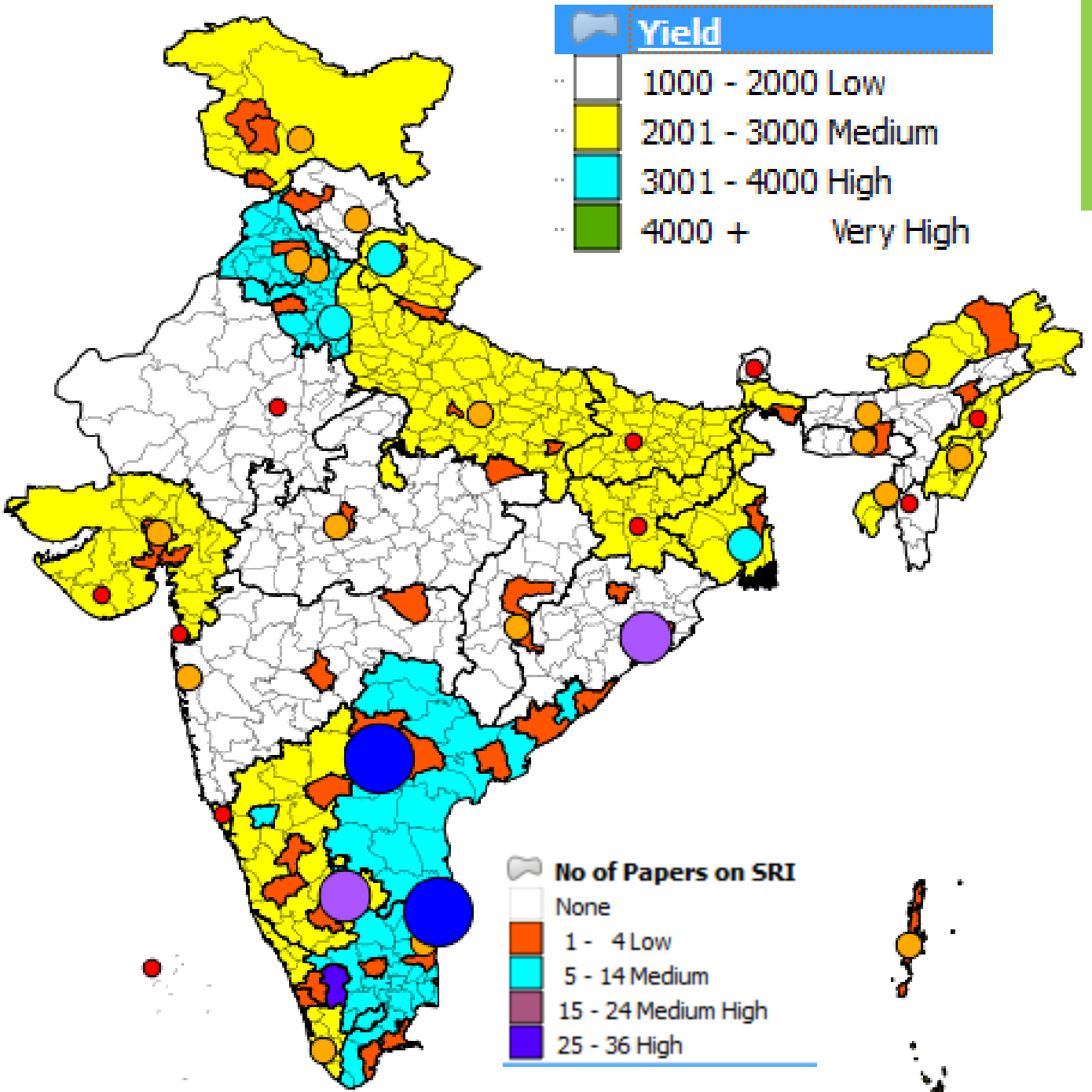
Circles represent state capitals

Disaggregation across districts

Research not concentrated only in capitals and Big states

Low research from key states of Bihar, Jharkhand, UP, Punjab, W Bengal and North East

GIS Map Indian SRI Research – state and District spread.. Yield wise



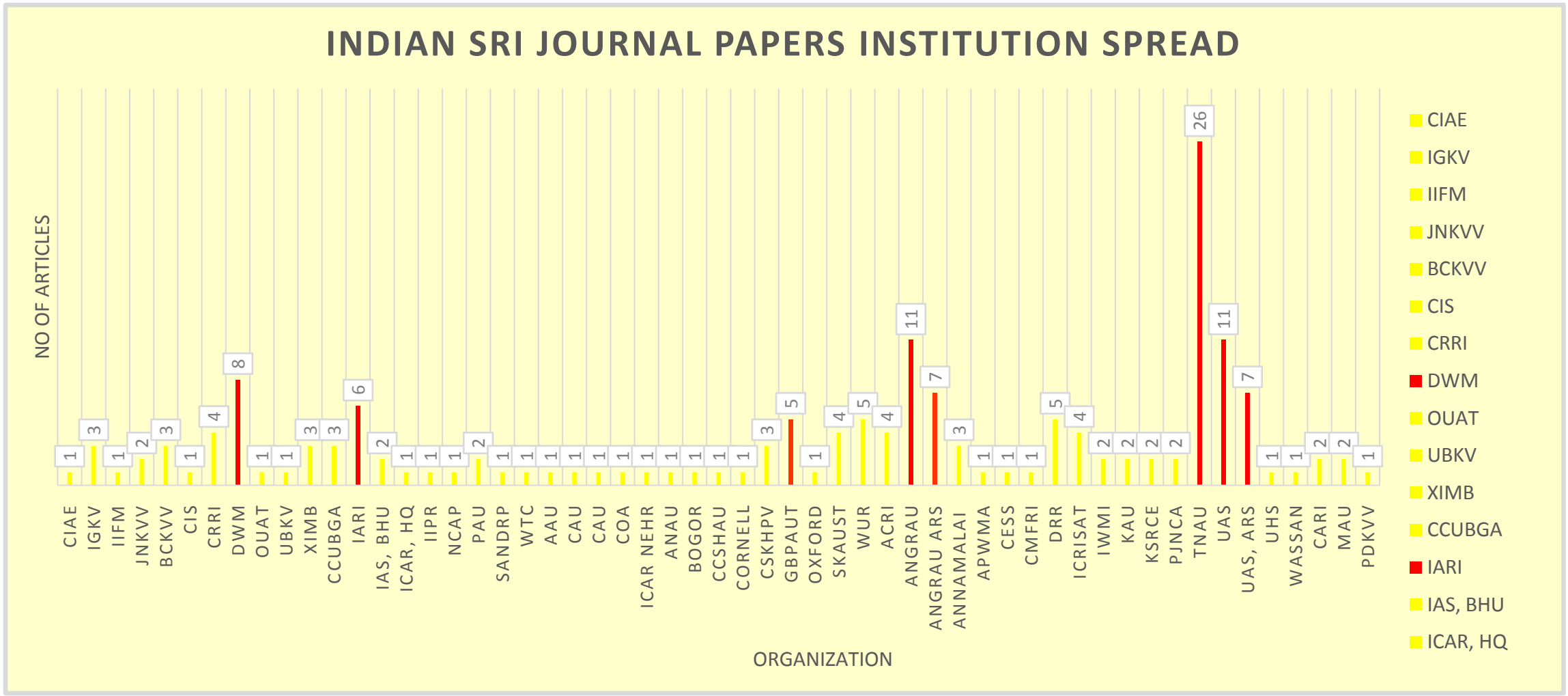
TN and AP are states with high average yields and also have high SRI research

Punjab and Haryana, high yields and very low SRI research

Odisha low yields and high SRI…good outlier

Scope for more research in Uttarakhand, UP, Bihar, Jharkhand, W Bengal

Organizations Involved in SRI Research in India

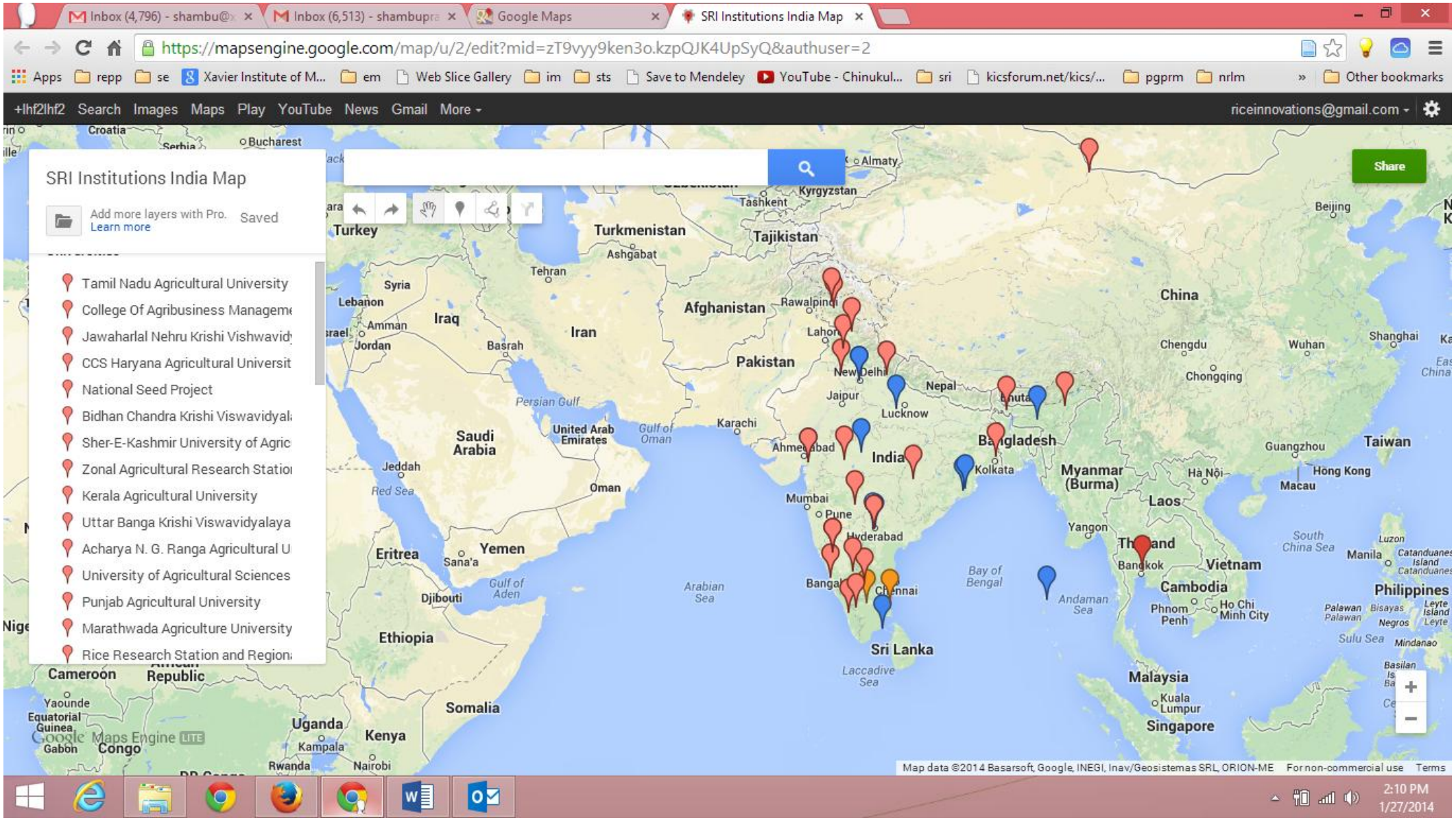


Over 55 organisations (or groups for SAUs) involved in SRI research

Key Organizations – Presence, Absence…

- State Universities TNAU, ANGRAU, UAS in South and their research stations on top.
- GBPAUT late entrant, more scope
- RAU, BMAU, BCKVV either not represented or low
- DRR (5) and CRRI (4) main research centres on rice not leaders but **DWM** (9)…
- Research by CSOs evident but not high, non agri academic institutions (XIMB, IIFM, Annamalai) extending SRI research
- ICRISAT active, IRRI no journal articles to show…..

SRI Institutional Google Map Beta…



2.4 What is the SRI India research community?

- The SRI community is large but not necessarily connected, few people are aware of their being part of a family of researchers.
  - Over 60% of authors (102) with single contribution….need to do more to add up
  - 17 authors with 2 papers each (20% of total papers),
  - Top 8 contributed 32 papers (19% of total)
  - The total number of researchers involved (including 2nd to 7th authors) is over 500 (1st author 168, 2nd (145), 3rd (105), 4th – 7th (69, 24, 10, 2)
- Key facilitators have been 2nd authors

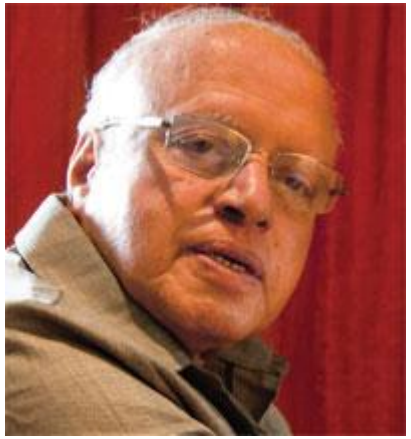
The Indian SRI Journal sub-system… 2013

Key First Authors	Key Faciltiators or Team members
Amod K Thakur,	K. Surekha
Gopalakrishnan, S.	T. M. Thiyagarajan
Krishna, A.	B. J. Pandian
R. Mahender Kumar	R. Mahender Kumar
Dass, Anchal	Sreelata Rath
Shambu C Prasad	N. Uphoff
Singh, Y. V	O. P. Rupela
Sridevi, V.	C. Padmavathi

NCS has involved most but not connected with a few. The ‘core’ is dynamic and can change every year

SRI has had no official research policy or programme to date. Despite this scientists seem to have assumed leadership, a goal that we have been striving for. Don't we have an opportunity here for investing and directing research on agroecological innovations?

OUR RESEARCH SHOULD BE FOR DEVELOPMENT, AND NOT FOR MERE RESEARCH.
OUR AIM SHOULD R4D AND NOT R&D
R B Singh
President, NAAS



Conclusions

- India important site for knowledge, Indian perspectives understated
- Much for India to be proud of, but
  - Not commensurate with potential and capacity
  - Social science research low despite SRI spread and social movement
- Networks and individuals ('knowledge champions') more than organisations play an important role in newer fields.
- SRI research inherently complex, more adaptive management and complex systems for planning and organizing research.
  - GIS tools can help more than SCI, JIF etc.

Science and Research Policy in India

- More collaboration amongst institutions necessary, how to avoid institutional rigidities (ICAR – SAU joint research programmes), ICAR civil society research
- The system will not move until ICAR, NAAS invest
- More work on nature of research – how to avoid being repetitive and learning from each other or work done, how to ask newer research questions, pursue newer directions