



RESEARCH
PROGRAM ON
Water, Land and
Ecosystems

Resource Recovery and Reuse

LESSONS FROM R4D IN PRODUCTIVE SANITATION

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OUTLINE

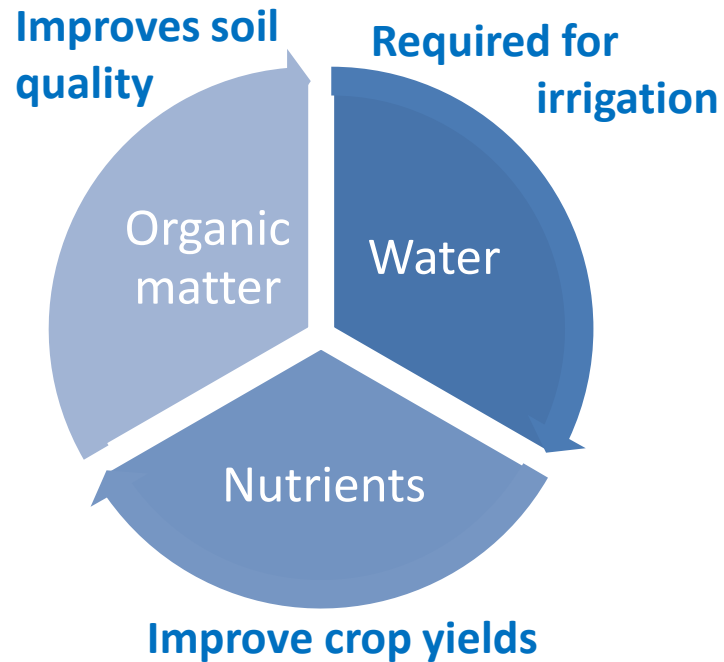
I. History of IWMI's work



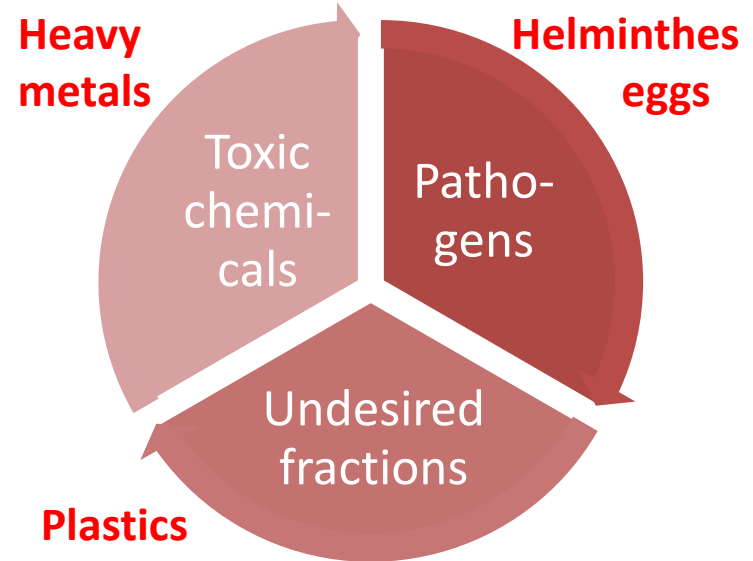
II. Lessons

WHAT IS CONTAINED IN WASTE ?

Opportunities



Challenges

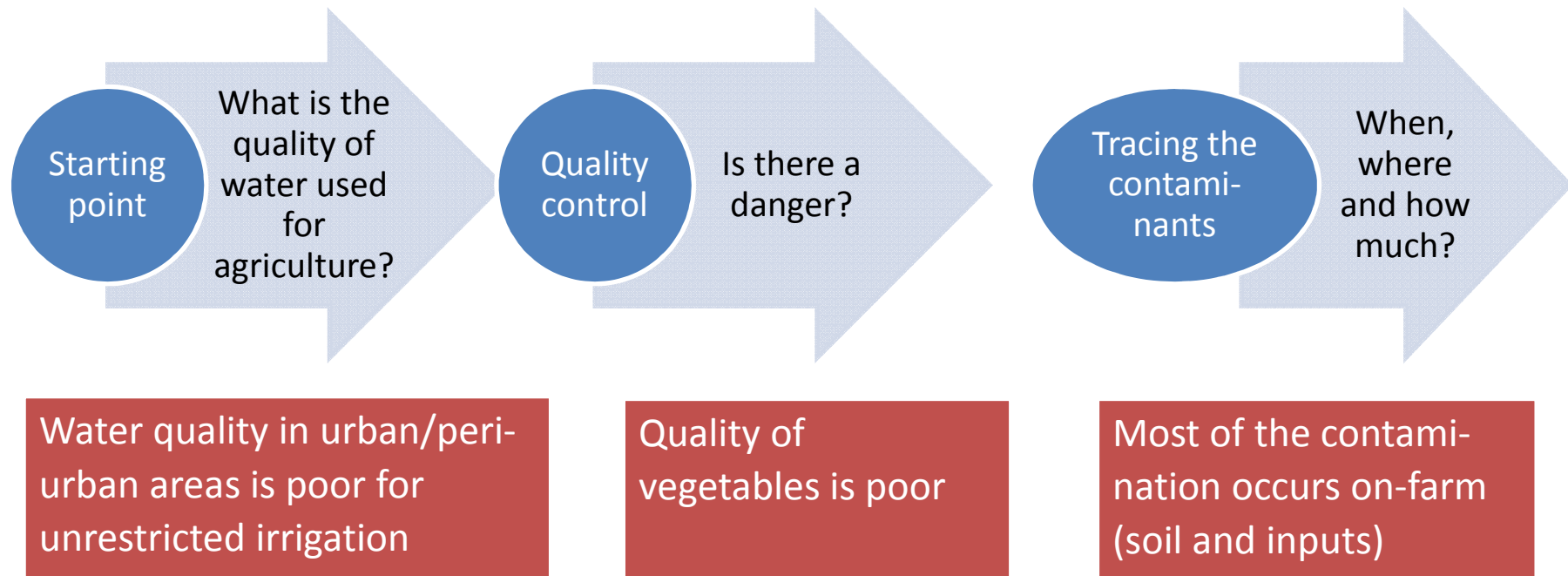


Safe quality improvement required



HISTORY - WASTEWATER MANAGEMENT

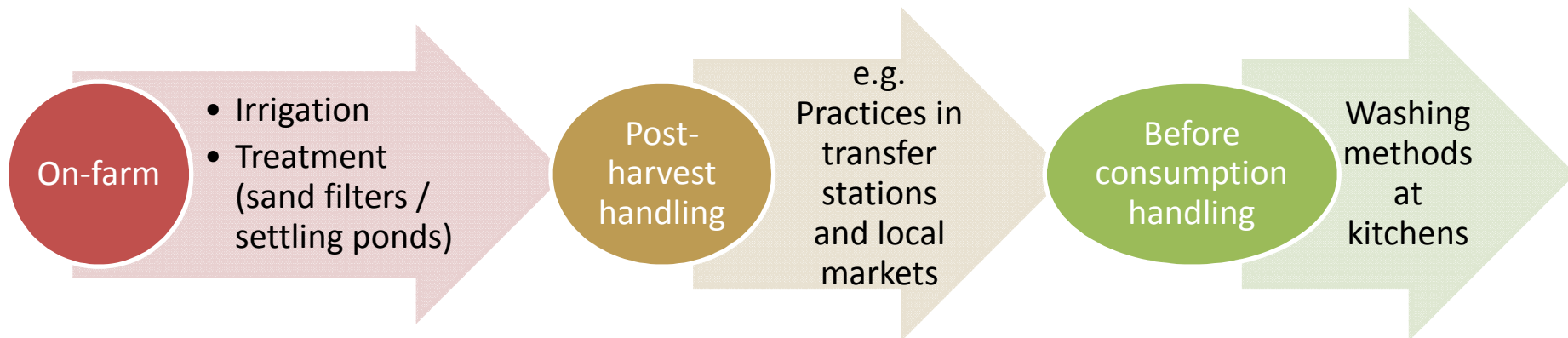
Between 2003 and 2007. Understanding the issues.



Ghana; Ongoing in Burkina Faso, Cameroon, Mali

POSSIBLE STRATEGIES FOR RISK MITIGATION

Between 2006 and 2010. Development of the multiple barrier approach.



A combination of at least two strategies needed for effectiveness

Recommendations made, taking into account local practices

Knowledge sharing (trainings / WHO)

Ghana, Burkina Faso, Togo, Benin, Cote d'Ivoire

POSSIBLE STRATEGIES FOR SUSTAINABLE OPERATION OF WASTEWATER TREATMENT PLANTS

Since 2011. Testing business models for safe water reuse.

Treatment plant designed to allow reuse

Safe reuse in irrigation

Safe reuse in aquaculture (e.g. Catfish)

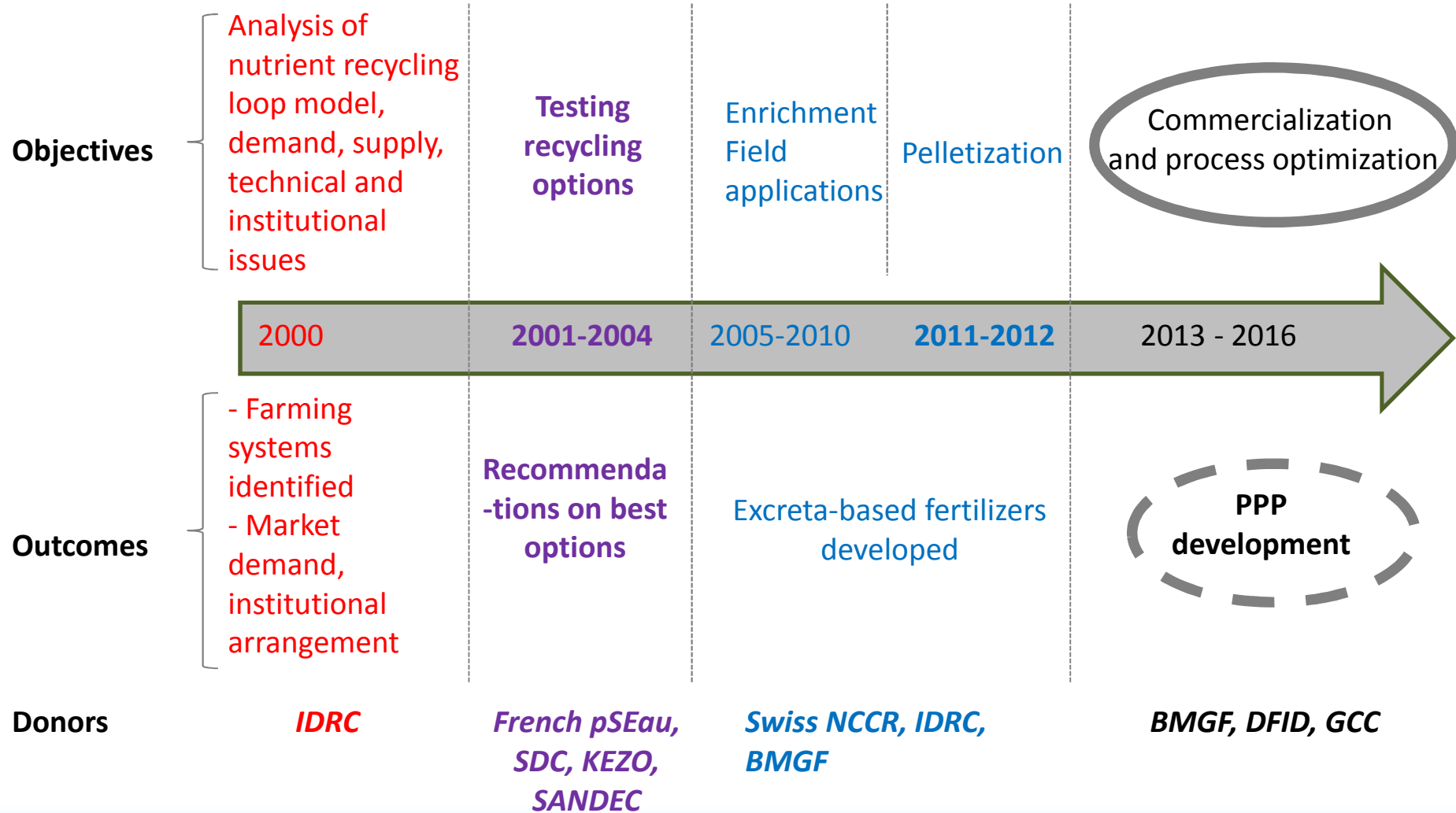
On-site energy production (e.g. biogas)



Clarias gariepinus
(African catfish)



HISTORY OF FECAL SLUDGE (AND ORGANIC SOLID WASTES) REUSE GUIDELINES





BUSINESS MODEL FOR THE FIRST CO-COMPOST PLANT

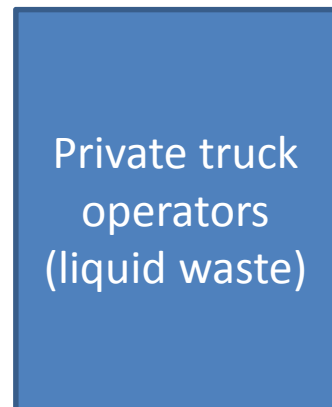
Land & Facilitation of access to fecal sludge



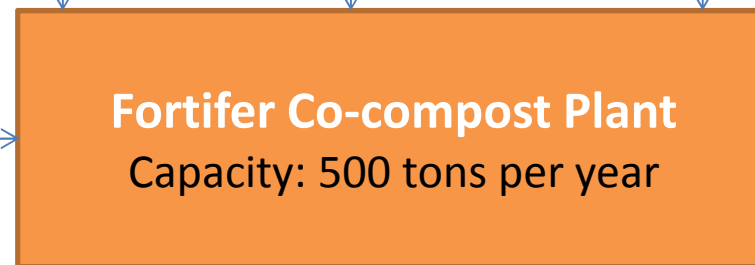
Management & Other necessary financial resources



Financial support for capital construction, marketing and Technology know-how



\$



Compost



\$

Partners: IWMI / Training Research & Networking for Development (TREND) / Universities

LOOKING BACK, ...

What worked?

- Research:
 - Strong / Adequate knowledge acquired
 - Good understanding of the challenges
 - Technology innovation
- Some buy-in from donors
- Positive influence on policy (MoFA, Ghana; WHO)

LOOKING BACK, ...

- **The private sector per se is not a panacea for solving the sanitation problems.**
 - There are strong and weak players
 - We need to rethinking partnerships and supporting legislations
- For Reuse, we need e.g. fertilizer companies and not only companies strong in waste collection and transformation.
- Government can support reuse/recycling;
 - Favorable policy environment
 - Many permissions needed
 - Processes for getting these are cumbersome
 - Imposing the selling of X% of compost (e.g. in India).
 - Clear protocols with standards and benchmarks.



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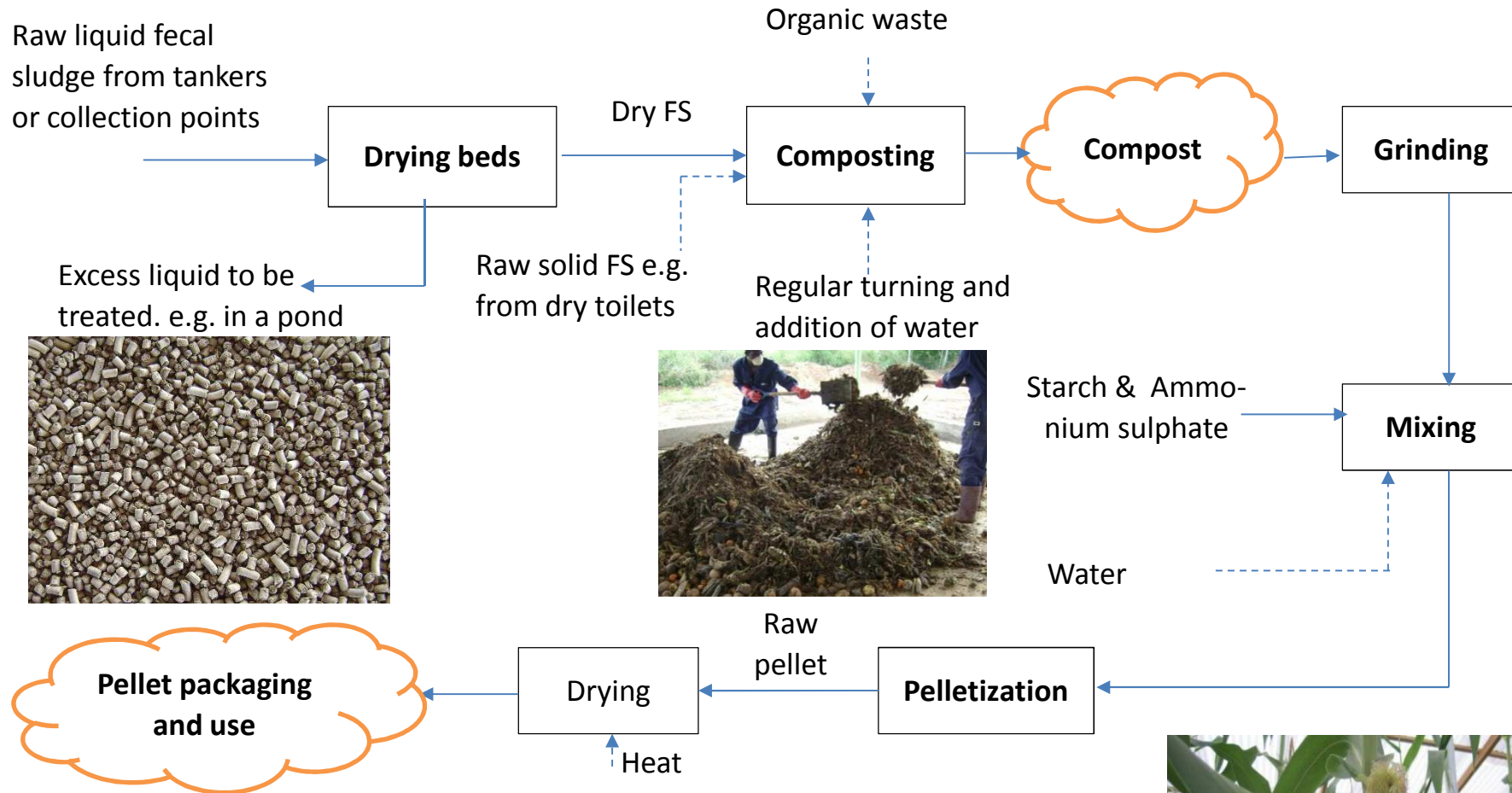
- Donors [Bill and Melinda Gates Foundation (BMGF), Department for International Development (DFID) and Grand Challenges Canada (GCC)].
- **All partners!** (TREND Group: Training Research and Networking for Development ; VVU: Valley View University; BNARI: Biotechnology and Nuclear Agriculture Research Institute, Ghana).



THANKS FOR YOUR KIND
ATTENTION !



THE FORTIFER TECHNOLOGY, FOR SAFE RECYCLING OF NUTRIENTS AND ORGANIC MATTER



- Fortifer is safe.
- Volume reduced by 20-50%

- No dust during application
- Nutrients are gradually being released into the soil
- < 10 US\$ per bag of 50 kg

FIELD TRIALS WITH TOGO MARSHALL RICE VARIETY



Rice field (conventional Farmer's practice)

200 kg of NPK 15-15-15 and 100 kg of AS. Top dressed with 50 kg of urea



Rice field with Fortifer.

Source: Ofosu-Budu, 2010, 2011, 2012

1,000 kg of enriched compost. Top dressed with 30 kg of ammonium sulfate (AS)

Yields were 20-50% higher with Fortifer