COST AND FINANCING

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SCALING UP RICE FORTIFICATION IN ASIA
Bangkok, September 16-19, 2014

Addressing Micronutrient Deficiencies: a Smart Investment

Top Investment Priorities

COPENHAGEN CONSENSUS CENTER

#1 Best investment

Bundled micronutrient intervention to fight hunger & improve education

- Malaria combination treatment
- Childhood immunization
- Deworming
- Tuberculosis treatment
- R&D to increase yield enhancements

"One of the most compelling investments – to get nutrients to the world's undernourished"
Vernon Smith, Nobel Laureate economist

Investment in Nutrition:

E.g. **Iron fortification of flour**

Cost 0.1 – 0.12 USD/pers/year

Cost Benefit Ratio: 8,7

Scaling Up NUTRITION

Lessons learned from Salt, Wheat – Iodine,Iron fortification

General:

- **Legislation**
- **Industry consolidation**
- **Partnership and Leadership**
- **Evidence based standards**
- **Regulation, regulatory system and regulatory monitoring**
- **Communication**

Cost related:

- Financial sustainability is an issue which needs to be solved, especially to allow **smaller producers** to remain viable.

  Increased industry consolidation improves impact, reduces costs.

  Financial sustainability needs consideration**: initial expenditures** are required (setting up monitoring systems where they do not exist; purchasing feeders for mills; social marketing campaigns), as well as covering **recurrent costs**.

- Cost for communication (Mandatory, Voluntary)

- Essential to allocate sufficient resources to Regulatory system (Mandatory)

Cost and Funding of fortified rice – Main sources of information

Fortified rice experience in 15 countries worldwide (5 in Asia)

Most small scale, Limited duration

Cost elements not always available

Research/Articles

Alavi, 2008, Roks, 2014, Forsman, 2014

Assessments

Philippines (2008, 2011)

Trials, implementation

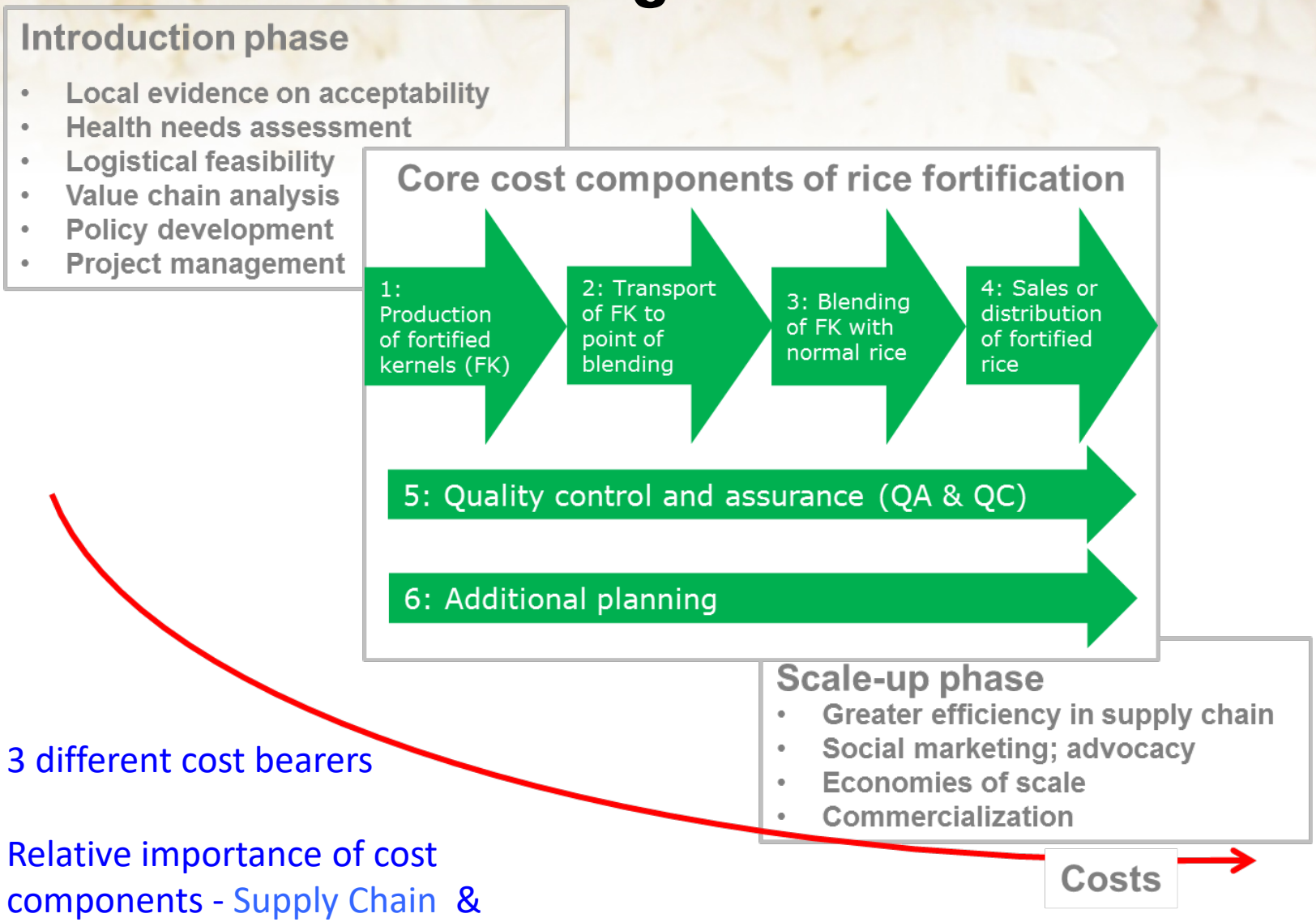
WFP (Bangladesh, Cambodia, India)

PATH

Private sector

DSM, Wenger, Wright, Usher

Rice Fortification Program – Costs



- 3 different cost bearers
- Relative importance of cost components - Supply Chain & Delivery option

Initial/Start Phase (excl. cost of FK/FR production)

Type – Once	Est. cost	Remark
Health/Nutrition Needs assessment*	High / Low	MICS, DHS, Food intake, etc.
Acceptability testing Kernel production Technology Development/Choice*	Low	 Public- private partnership
Logistical Feasibility testing	Low	e.g. blending trials
Supply Chain/Landscape Analysis	Low	
Cost-Benefit Analysis*	Low	As part of advocacy strategy

*: optional

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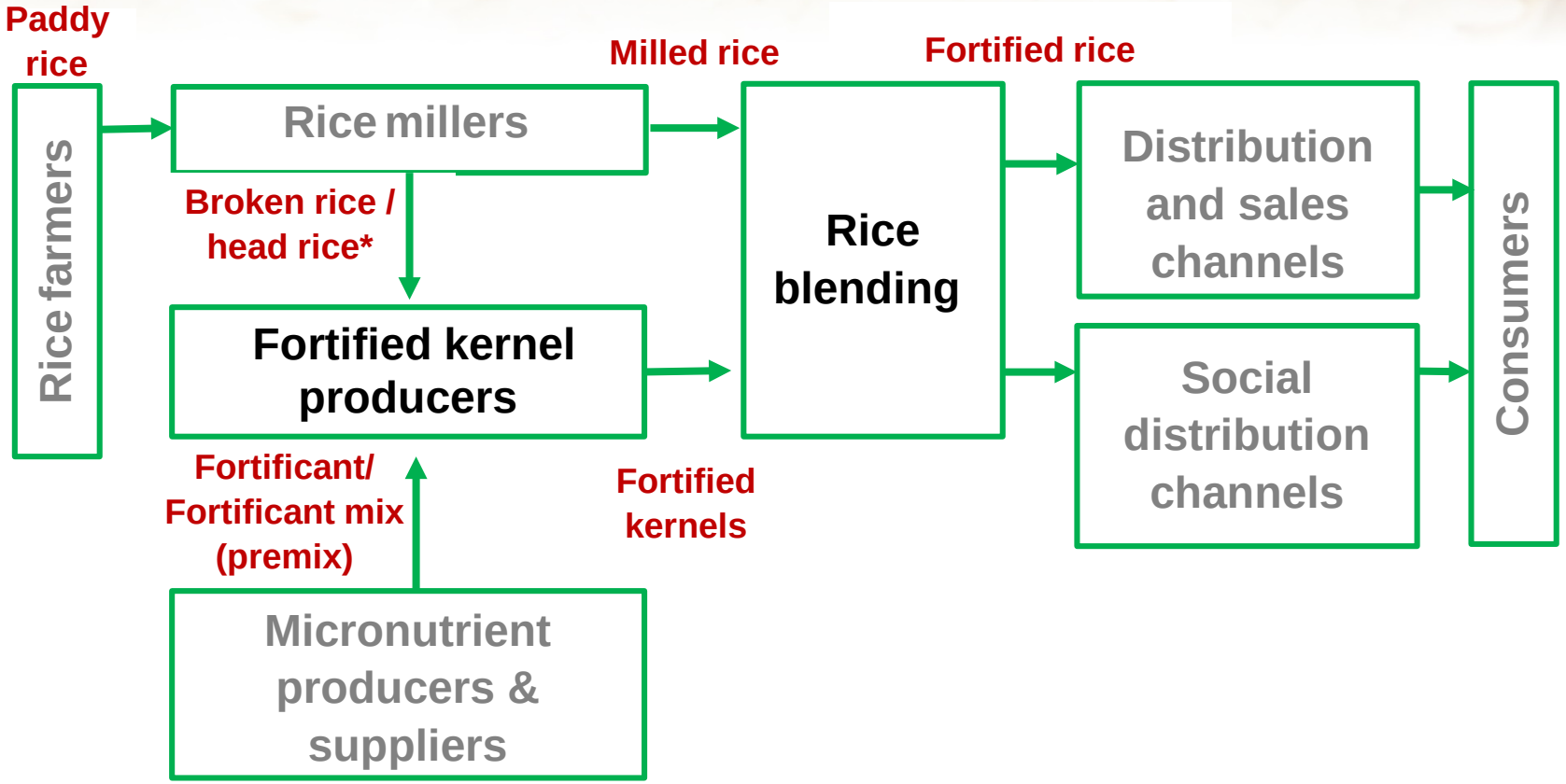
Initial/Start Phase (excl. cost of FK/FR production)

Type - To be Continued	Est. cost	Remark
Partnership & Coordination setup	Low	To be continued during implementation
Legislation/Policy development, incl. standard setting	Low	To be continued during implementation
Setting up of Quality Control System	Mod. / Low	Specific resources to be allocated

Different components, rather low cost/component
Opportunity for cost sharing partnerships

Fortified Rice Supply Chain

Applies to coating and extrusion



* For extrusion technology broken rice can be used to produce fortified kernels, with coating technology head rice is required

Initial and Recurrent Core Cost Components of Production of FK and FR

COST (FK)

COST (FR) After production

COST (FR) consumer

1: Production of fortified kernels (FK)

- Final product
- Establishing production facilities

2: Transport of FK to point of blending

- (international) transport
- Customs clearance / importation
- Local transport

3: Blending of FK with normal rice

- Establishing equipment
- Operating costs (incl. labor)

4: Sales or distribution of fortified rice

- Awareness / (social) marketing
- Monitoring & Evaluation

5: Quality control and assurance (QA & QC)

6: Additional planning

Production of FK: Capital investment made by private sector (partly/entirely recovered from consumer or govt/SSN implementer)

Type	Type of equipment needed	Annual production	How Much?
Hot extrusion	Rice flour production, extruders, conveyers/driers	Over 1500MT	1,2 – 1,8 milliom
Warm extrusion		?	Medium
Cold extrusion		730 MT	750.000 USD
Coating	Drums, sprayers	430 MT	350.000 USD
Building Space			
QC Technology			

Production of FK: Typical Core/Recurrent Costs paid by Private sector (entirely or partly recovered from consumer or Govt SS implementer)

Type	Relative Contribution to Cost	Remark
Procurement and storage of vitamins and minerals	Limited influence – approx. only 30%	Cost effective to include multiple MN Trade off between higher levels of MN and lower blending ratio
Broken/Head rice*	Important cost factor	Higher in case of coating
Operating costs (staff, electricity, etc.)	Important cost factor	Drying costs contribute significantly (energy)
Internal Quality Control		
Repayment of loans		
…		

*: broken rice is required for extrusion technology, head rice for coating technology

Production of Fortified Kernel – General

2 Supply chains need to be established: fortificant premix - rice

Capacity utilization is key

Availability FK at scale can become a problem
CAREFUL PLANING NEEDED

Costs at FK production difficult to establish – depends on availability of preexisting equipment, the choice of fortification technology, and supply chain limits and enabling environment

Transport Fortified Kernels to Blending Point

- **International transport**
  - Distance
  - Mode of transport: rail, road, air, see
  - Quantity
  - Transport market price fluctuations
  - Import fees and customs clearance
- **Local transport**
  - Distance
  - Supply chain complexity
  - Quantities

Blending at point of FK production is most cost-efficient
BUT doesn't lead necessarily to sustainable market …

Blending: Typical Investment and Recurrent Costs paid by Private sector, but passed on to…

Type		Remark
Dosing/Blending equipment	Continuous High Batch Low	Blender system Kernel feeder & scale Mixer & scale
Procurement and storage FK	Important Cost of FK depends on inclusion rate – trade of between cost & acceptability/technological aspects	Storage stability depends on MN content (Vit A and Vit B 1) Estimated at 80 – 90% of fortification costs (**excl. transport**, but incl. repayment of loans, QC, etc.)
Internal Quality Control	Relatively simple	
Other operating costs (staff, electricity, etc.)	Continuous: lower labour costs Batch: higher labour costs	
Repayment of loans		

Production of Fortified Rice – General

Inclusion rate

Cost FK important cost component of FR

Transport – supply chain: FK to blending site (and head/broken rice to FK production site)

Not possible to provide one cost figure that can be applied everywhere

Sales or Distribution of Fortified Rice

	Mandatory	Voluntary	Social Safety Nets
Social markting/Advertising	Needed	High	Needed
Transport, Storage (shelf life)	Costs can be reduced through improving supply chain management		
Possible public Health impact (CBR)	Yes	Limited	Yes, if SSN is well targeted and implemented
External quality assurance and quality control (QA & QC) – Regulatory environment	Moderate	Limited	Moderate

Quality Control & Quality Assurance (Internal & External)

- **Assessment and certification of fortified rice and suppliers**
  - Quality of fortified kernels
  - Micronutrient mix used and levels of micronutrients
- **Validation of the blending process**
  - Fortification ratio
  - Homogeneous mixing
- **Availability of lab facilities**
  - Certification and auditing of labs
- **Clear guidelines and requirements for rice fortification**
  - Integrated in regulatory framework
  - Mandatory legislation

QC & QA/Regulatory system – General

Total Quality Approach – Integrated in existing systems
Internal - External

Conduct at FR production sites, instead of retail

Right balance between incentives and punitive measures

Rather low cost, but needs ADDITIONAL ATTENTION

Additional Planning

- **Impact of fortified rice on production cycle**
  - Stock of fortified rice at mill; or
  - Increase production lead-time
- **Expiration date**
  - Fortified rice: 1 ½ - 2 year self live after blending, reducing the shelf live of rice (levels of micronutrients decrease over time)
  - Rice milling industry, wholesalers and retailers to adjust stock management practices
- **Double check possible PH impact**
  - Do people that can benefit most from rice fortification access the FR?

Improve supply chain – Increase market consolidation

Improve CBR - Optimise targeting for PH impact

Scale Up Phase

- **Essential cost components remain but greater efficiency in the supply chain and economies of scale**
  - Increased market size
  - Commercial market development
- **Reduction in fortified kernels costs**
  - Local production of fortified kernel - Cost of transport lowered substantially
- **Legislation**
  - Mandatory fortification standards
  - Clear guidelines
- **Consumer awareness**
  - Social marketing – Awareness raising
  - Avoid misconceptions
- **Coverage**
  - Increase coverage – availability of FR

Public-private partnerships important for successful scale up

Cost Component	Social Safety Net	Mandatory	Voluntary
Advocacy	Donor	Donor	Donor/Government/ Miller
Landscape Analysis	Donor/Government	Donor/Government	N/A
Prog design/planning	Donor/Government	Donor/Government	N/A
Production of FK			
• **Initial cost of plant**	N/A or Government	Private sector	Private sector
• **Recurring Costs**	Government	Miller/Consumer	Miller/Consumer
Transport of FK to blending point	Government	Miller/Consumer	Miller/Consumer
Blending	Government	Miller/Consumer	Miller/Consumer
Distribution	Blending	Miller/Consumer	Miller/Consumer
Marketing & Promotion	N/A	N/A	Miller/Consumer/Government
Quality assurance	Government	Miller/Consumer	Miller/Consumer
Regulatory monitoring & enforcement	Government	Government	Government or N/A
Impact Evaluation	Government	Government	N/A

Cost comparison per company, as received from company representatives present in this workshop on 17 Sept.

Type	Tech	$/kg FK	Inclusion ratio	%/MT FR	Nutrients
Buhler F	extrusion	**2,5** **3,0**	0,5 – 1,0% 0,5 – 1,0%	12 – 25 15 - 30	Price variation for VM
U Agro	Warm Extrusion	**2,0** **2,5** **3,0**	1%	20 25 30	Iron only Iron, Folic Acid Iron, Folic Acid and Thiamin
Wright	ating	**1,6** **2,0** **2,5**	0,5% 0,5% 0,25%	8 10 6,25	Iron only 'fully loaded' Costa Rica
Wenger	Hot Ext.	Available upon request			

Price of Rice

Scale of production

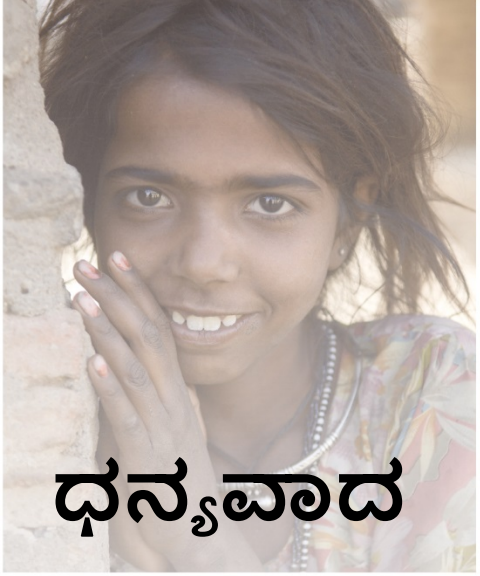
Price of FR (FK) depends on what customer/country needs:
- MN content
- SCALE

2014

Closing remarks

- Different context specific factors define cost (FK, FR after production, consumer)
  - Supply chain (transport) – level of industry consolidation
  - Price of rice, electricity,…
  - Delivery option
  - Scale

⇒ Not possible to give a general cost figure
⇒ Costing exercise is needed for each specific context
⇒ More cost analysis will allow to better understand cost components and relative importance



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Thank you

Terima kasih

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Salamat Po

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