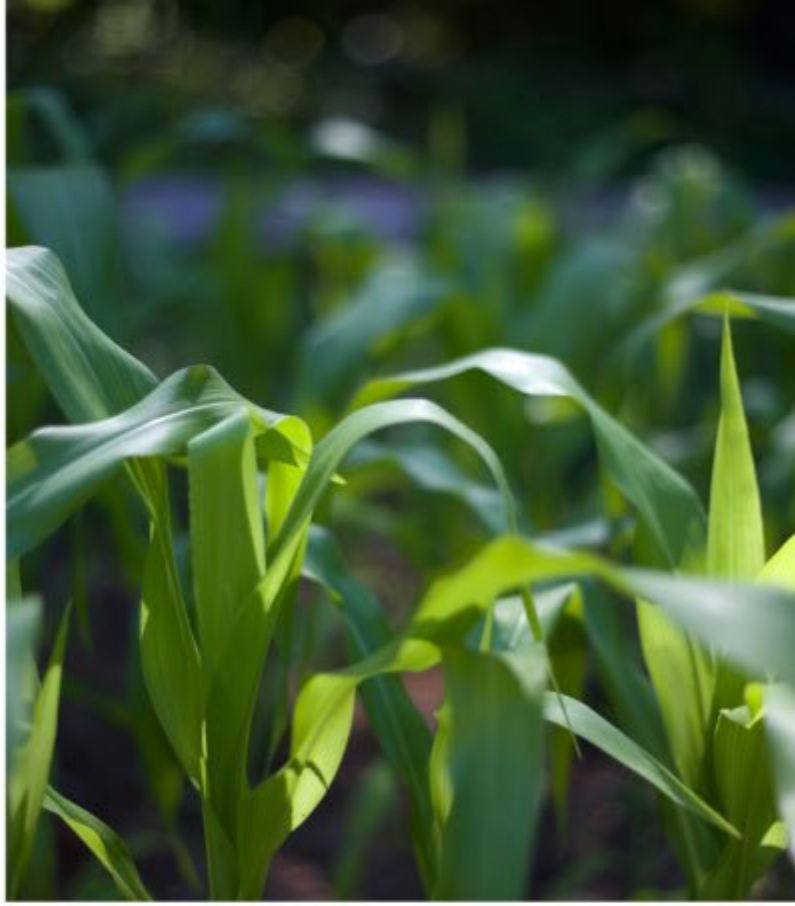




Food Fortification Initiative

Enhancing Grains for Healthier Lives

FFI's global strategy for scaling grain fortification

JULY 2023

FFI’s role and unique contribution

Expertise

Uses in-house expertise to apply a data-driven approach to program planning, implementation, and monitoring

Rigor

Operates through a unique model, bringing together voices from the public, private, and civic sectors

Conducts supply chain analyses for any given grain to discover and act on opportunities to advance fortification

Documents and publishes up to 195 countries’ annual progress toward successful cereal grain fortification

Focus

Focuses exclusively on large-scale fortification of the three most consumed grains: wheat flour, maize flour, and rice

Disciplined people → **Disciplined thought** → **Disciplined action**

A heavy global burden of micronutrient deficiencies

2 billion +
People worldwide suffer from the effects of micronutrient malnutrition.[1]

1.2 billion
Women of reproductive age have at least one micronutrient deficiency.[1]

372 million
Half of all preschool-aged children have at least one micronutrient deficiency.[1]

218,270
Babies were born with folic acid-preventable birth defects of the brain and spine in 2020.[2]

Photo: Dominic Chavez/World Bank

[1] Stevens, G., et al. Micronutrient deficiencies among preschool-aged children and women of reproductive age worldwide: a pooled analysis of individual-level data from population-representative surveys. The Lancet Global Health. 2022.
[2] Kancherla, V., et al. A global update on the status of prevention of folic acid-preventable spina bifida and anencephaly in year 2020: 30-Year anniversary of gaining knowledge about folic acid's prevention potential for neural tube defects. Birth Defects Research. 2022.

Photo: Ray Witlin

UNMET POTENTIAL

Most of the world's industrially milled grains are not yet fortified.

	WHEAT FLOUR	MAIZE FLOUR	RICE
	million metric tons	million metric tons	million metric tons
Available for human consumption	414	70	320
Industrially milled	338	25	126
Industrially milled and fortified	105	10	11
% industrially milled and fortified	**31%**	**42%**	**9%**

Source: Unpublished data. Food Fortification Initiative. 2023.

The global gap

An additional 82% of birth defects of the brain and spine[1] and 34% of global anemia cases[2] could still be prevented through adequate intake of iron and folic acid.

[1] https://www.ncbi.nlm.nih.gov/pubmed/30070772
[2] https://www.ncbi.nlm.nih.gov/pubmed/30997493

Photo: Benedicte Kurzen

Three key steps

1. Data-driven assessment
2. Four-stage phased approach
    - Explore and engage
    - Map the context
    - Design and develop
    - Monitor for compliance and impact
3. Strategy in action

Photo: Bernd Flink

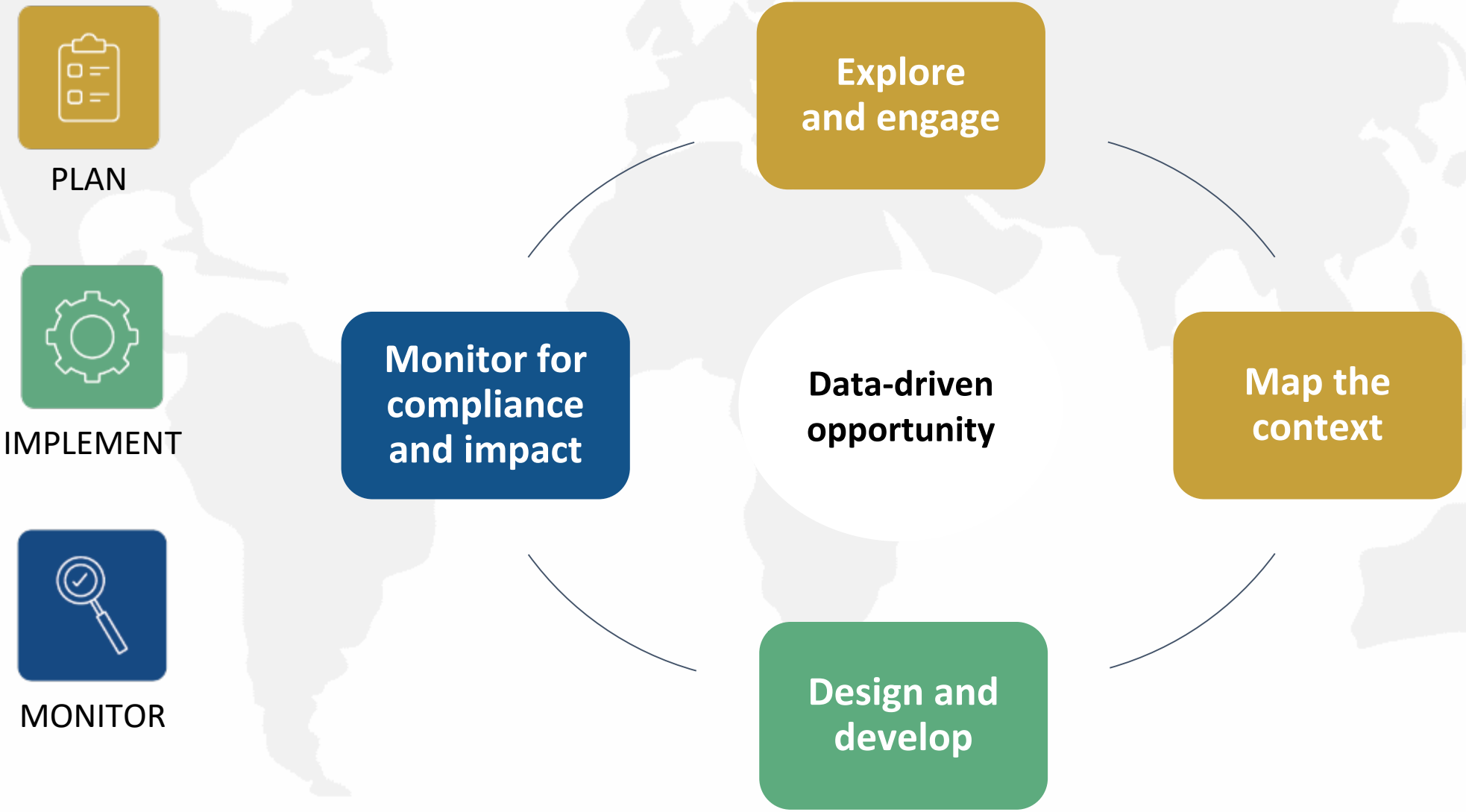
Data-driven assessment

- Our work starts with data and understanding the country context
- First, we determine if a country or state has potential and demonstrated need for fortification using:
  - Consumption and milling analyses
  - Nutritional need assessments/analysis of existing standards
  - Market analyses
  - Political readiness assessments
  - Current fortification reviews
  - Partner interviews

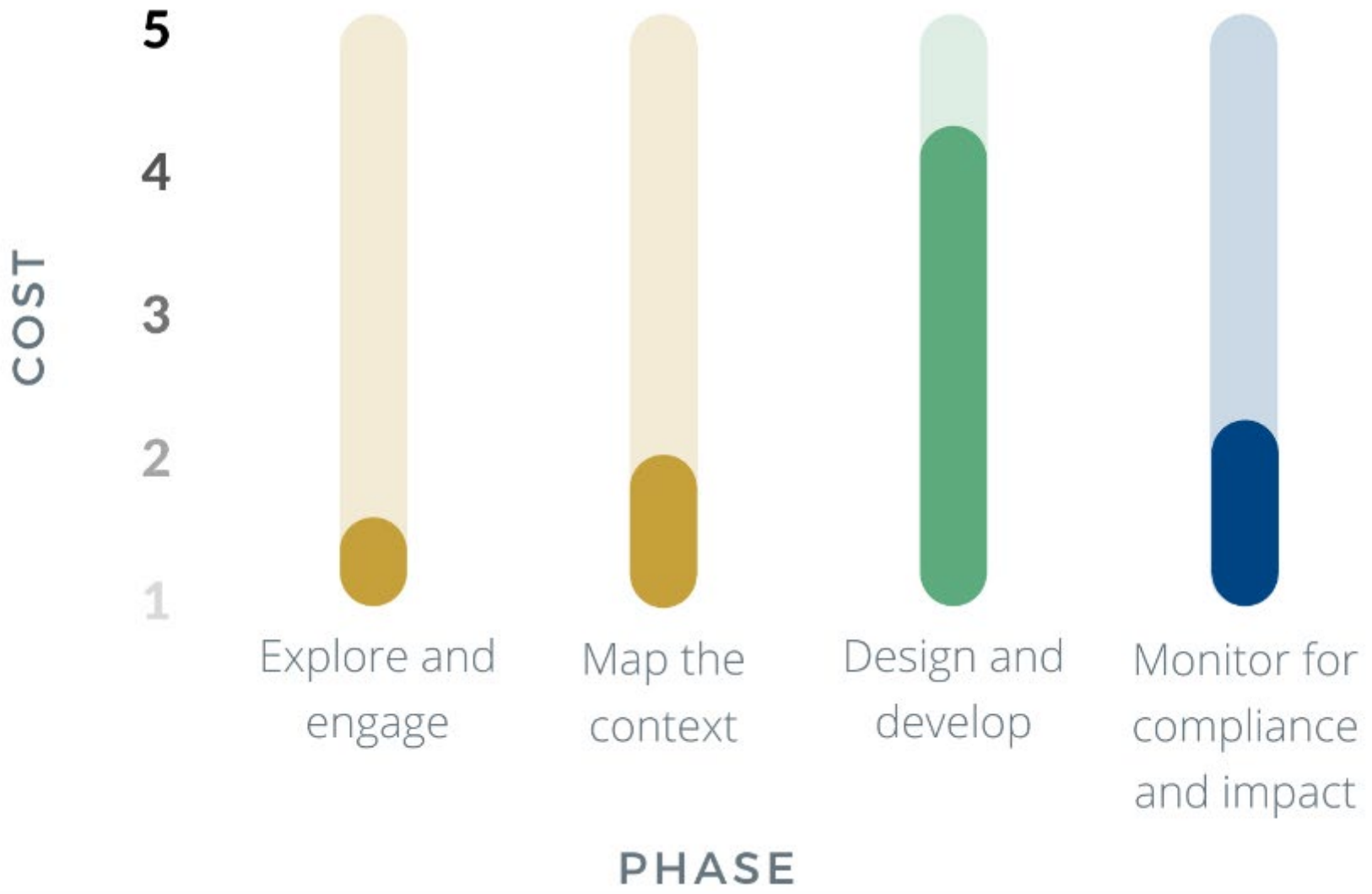
Four-stage phased approach

Photo: Hasim Hayder

Strategic phases of fortification



Strategic phases of fortification



1. Explore and engage

- Once a data-driven opportunity is determined:
  - Engage private sector
  - Engage birth defects groups, neurosurgeons, and consumer associations
  - Identify key challenges and opportunities
  - Identify a champion/champions within government
  - Determine what it will take to move forward

Permission and willingness of government to move to next phase

Photo: Aftab Uzzaman

2. Map the context

- Conduct a thorough supply chain diagnostic
- Assess industry structure including readiness and reach of mills
- Assess monitoring structure and needs
- Map the legislative process
- Assess budgetary needs (initial investment by sector and annual recurring costs) to ensure commitment and sustainability
- If necessary, conduct a cost-benefit analysis making the case for fortification's impact on national health and economic indicators

- Formal presentation to government to recommend effective staples and market channels based on diagnostic results
- Government plan, permission, and support to move to the next phase

Photo: Dominic Chavez

3. Design and develop

- Draft recommended standards
- Identify miller, regulatory inspector, and laboratory training needs
- Support premix procurement process
- Engage the legislative process
- Develop a communication and education strategy
- Integrate realistic fortification monitoring into existing framework

Clear budget and implementation plan

- Train millers on QA/QC practices
- Train regulatory monitoring inspectors and lab staff; map agency responsibilities
- Facilitate the passage of legislation
- Develop a National Fortification Guidelines document and national logo, as necessary

Fortification program is implemented and ready to scale

Photo: RTI/Xaume Olleros

4. Monitor for compliance and impact

- Support collection of monitoring data
- Ensure monitoring data is shared with relevant stakeholders
- Augment government monitoring partnerships with civic entities
- Ensure action is taken to improve program performance based upon monitoring data

Ensure program reaches intended population

- As relevant, partner with stakeholders to measure impact

Photo: Arjun Claire

EXAMPLES OF

Strategy in action

Photo: Muthuraman/Flickr

AFRICA

Data-driven assessment

- Assessment of 54 African countries via:
  - Partner interviews and mapping
  - Socio-cultural assessment
  - FFI, Global Fortification Data Exchange (GFDx), World Bank, and Food and Agriculture Organization (FAO) database analyses
- Six priority country tiers were identified by combining information from:
  1. Partner interviews
  2. Updated country profiles
  3. Updated FFI country-specific color codes
  4. Results of a priority matrix exercise

Photo: RTI

Country priority ranking

Health impact

- Population (15%)
- NTDs per year (7.5%)
- NTDs per 10,000 births (7.5%)
- Anemia in non-pregnant woman (30%)
- Urban population (5%)
- % Cereal milled industrially (20%)
- Cereal availability (15%)

Final score of 1-5

1 = minimal impact

5 = maximum impact

NTDs: Neural Tube Defects

Ease of implementation

- % Living in urban settings (20%)
- Political stability* (10%)
- Government effectiveness* (10%)
- Regulatory quality* (10%)
- Number of industrial-sized mills (20%)
- % Cereal milled industrially (10%)
- Mandatory salt iodization (20%)

Final score of 1-5

1 = minimal impact

5 = maximum impact

*World Bank Indicators

Health impact and ease of implementation combined to form total score.

Final Wheat Fortification Matrix

Country Ranking

Great

Health Impact

Low

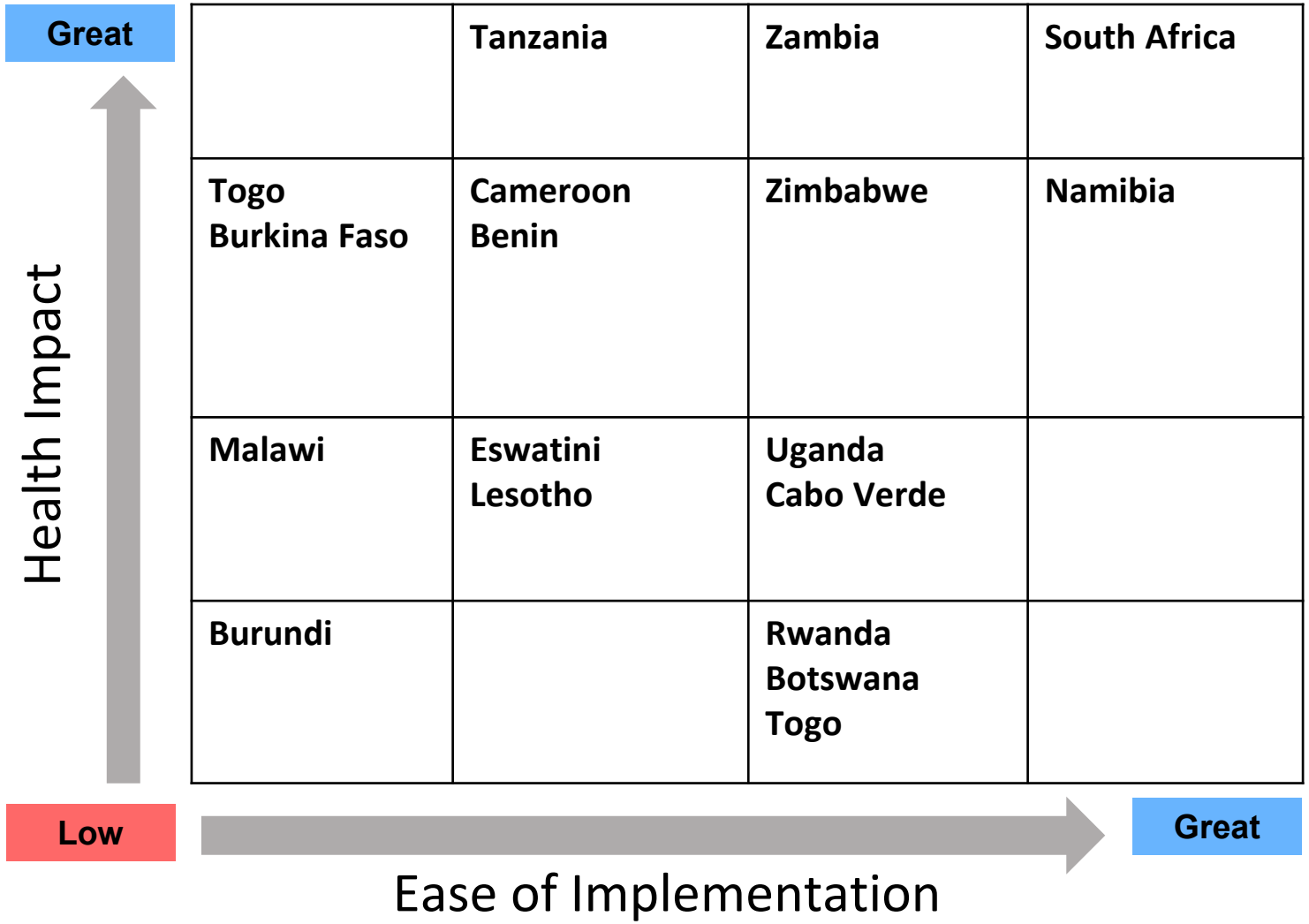
		Egypt	*Algeria* Morocco
Somalia	Sudan Liberia Congo Rep. Libya Madagascar Angola	Sao Tome & Principe Sierra Leone Gabon Tunisia	South Africa
Ethiopia Eritrea	Lesotho Eswatini Equatorial Guinea DRC Zimbabwe	Mauritius Namibia	Zambia Botswana
Burundi Comoros		Seychelles Rwanda	

Great

Ease of Implementation

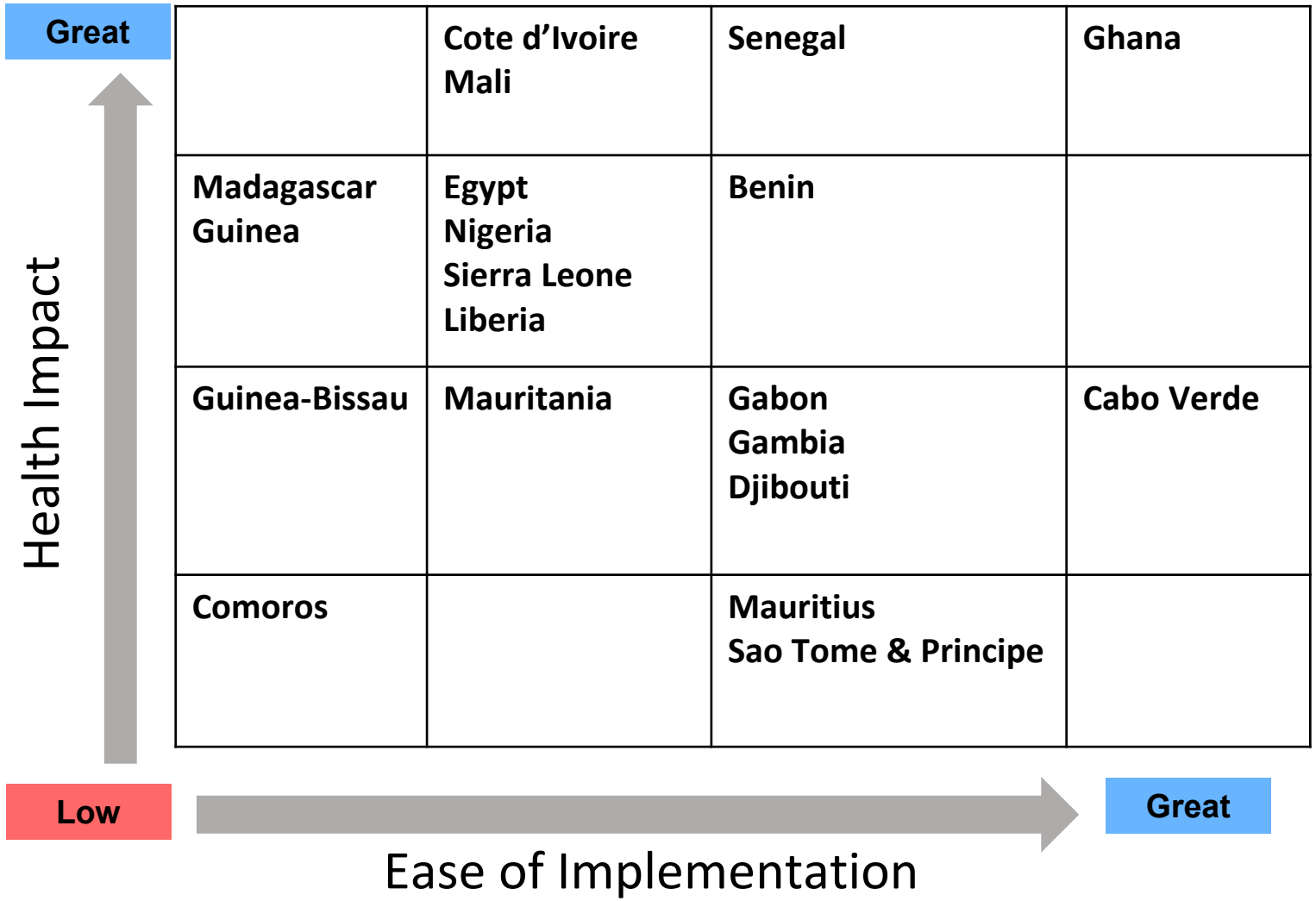
Final Maize Fortification Matrix

Country Ranking



	Tanzania	Zambia	South Africa
Togo Burkina Faso	Cameroon Benin	Zimbabwe	Namibia
Malawi	Eswatini Lesotho	Uganda Cabo Verde	
Burundi		Rwanda Botswana Togo	

Final Rice Fortification Matrix
Country Ranking



	Cote d'Ivoire Mali	Senegal	Ghana
Madagascar Guinea	Egypt Nigeria Sierra Leone Liberia	Benin	
Guinea-Bissau	Mauritania	Gabon Gambia Djibouti	Cabo Verde
Comoros		Mauritius Sao Tome & Principe	

AFRICA

Strategic targets

FFI is supporting at least 10 countries and seeking additional funding to expand and continue this support.

EXPLORE & ENGAGE	MAP THE CONTEXT	DESIGN & DEVELOP	MONITOR FOR COMPLIANCE & IMPACT
Algeria	Angola	Egypt	Mozambique
Morocco		Ethiopia	South Africa
Tunisia		Botswana	Uganda
		Mauritius	
		Zimbabwe	
		Namibia	

Photo: RTI

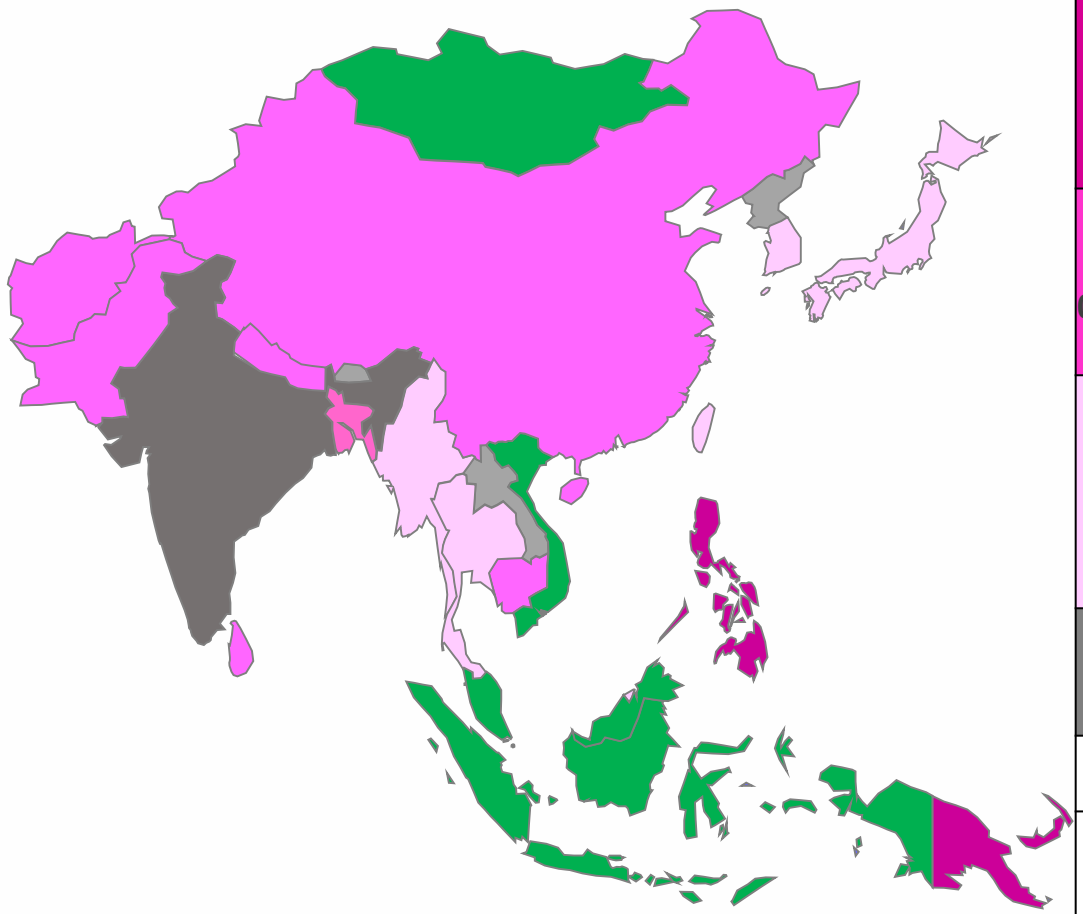
ASIA-PACIFIC

Data-driven assessment

- Assessment of 28 Asian countries via:
  - Database analyses
  - Creation of country profiles
  - Partner interviews and mapping
- Priority tiers were identified through:
  - Industry analyses
  - Assessment of grain availability
  - Assessment of fortification environment for wheat and rice

Photo: Steve Evans

Asia-Pacific: Strategic approach to rice fortification



Number on color block below indicates number of countries in that color code.		*Total Population (in millions)*	*Urban Population (in millions)*	*% of total Asian urban population*
1	Over 75% of industrially-milled flour available is fortified.	22	20	**1.7%**
6	Confident country will move to 75% by November 2012.	361	155	**13.1%**
2	Industrial milling processes and/or advocacy networks make fortification viable. Burden of disease can be addressed by fortification. Focused efforts to support current networks and fill gaps.	100	46	**3.9%**
10	No plan for significant time or finances to push fortification at this time. FFI will actively initiate and support grassroots efforts to advance fortification.	1,770	762	**64.4%**
6	The political environment and/or public perception does not favor fortification. Comparatively low burden of disease. FFI to engage in strategic advocacy and monitor the situation.	315	184	**15.5%**
3	Wheat fortification likely to have very limited health impact or is not feasible at this time.	31	17	**1.4%**
	Totals	2,599	1,184	**100%**

Priority 1

Priority 2

Strategic Advocacy

Population and Urbanization figures from United Nations Population Division.
Percents created using non-rounded population figures.
Includes Australia, New Zealand and Fiji-not mapped.

ASIA-PACIFIC

Strategic targets

FFI is supporting at least 8 countries and seeking additional funding to expand and continue this support.

EXPLORE & ENGAGE	MAP THE CONTEXT	DESIGN & DEVELOP	MONITOR FOR COMPLIANCE & IMPACT
Papua New Guinea	Bangladesh	Indonesia	
	Sri Lanka	Malaysia	
		Mongolia	
		Philippines	
		Viet Nam	

Photo: Steve Evans

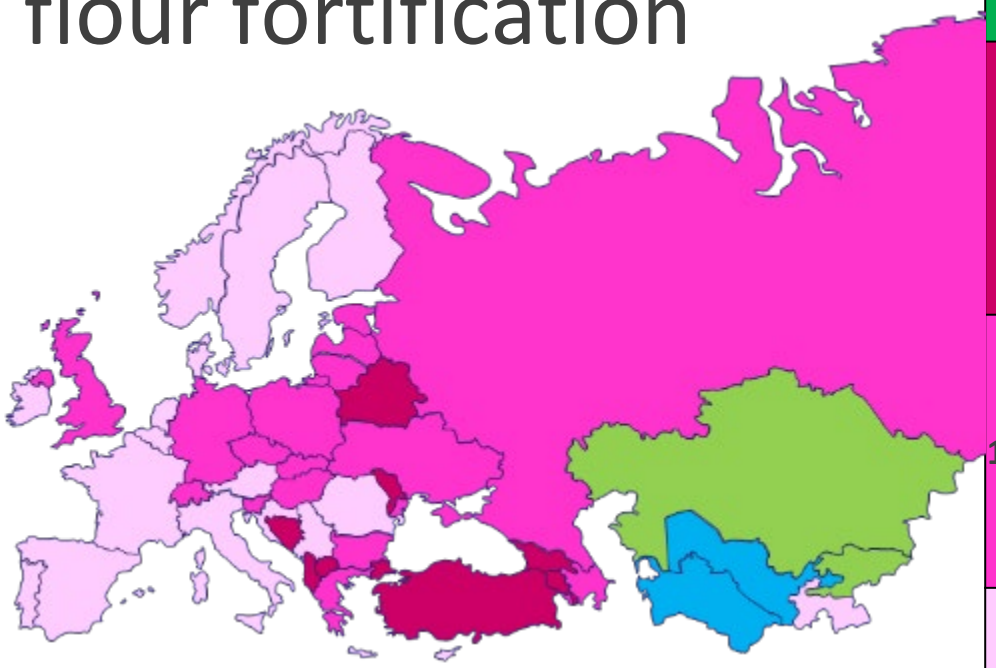
EUROPE

Data-driven assessment

- Assessment of 49 European countries via:
  - Database analyses
  - Creation of country profiles
  - Partner interviews and mapping
- Priority tiers were identified through:
  - Industry analyses
  - Assessment of grain availability
  - Assessment of fortification environment for wheat

Photo: Pierre/Flickr

Europe: Strategic approach to flour fortification



Number on color block below indicates number of countries in that color code.

		Population (in millions)	*% of Total European Population*
2	Over 75% of industrially-milled flour available in the country is fortified.	32	3.6%
2	Confident country will move to 75% by November 2012.	21	2.4%
9	Industrial milling processes and/or advocacy networks make fortification viable. Notable burden of disease that can be addressed by fortification. Efforts focused to support current networks and fill gaps.	**Priority 1** 104	11.7%
16	No plan to spend significant amounts of time or finances to push fortification at this time. FFI will actively initiate and support grassroots efforts to advance flour fortification.	**Priority 2** 442	49.6%
20	The political environment and/or public perception do not favor fortification. Comparatively low burden of disease. FFI will engage in strategic advocacy and monitor the situation.	**Strategic Advocacy** 291	32.6%
	Totals	890	100%

Population figures from United Nations Population Division.
Percents created using non-rounded population figures.

EUROPE

Strategic targets

FFI is supporting at least 9countries and seeking additional funding to expand and continue this support.

EXPLORE & ENGAGE	MAP THE CONTEXT	DESIGN & DEVELOP	MONITOR FOR COMPLIANCE & IMPACT
Turkey		Azerbaijan	Turkmenistan
		Georgia	United Kingdom
		Kazakhstan	Uzbekistan
		Kyrgyzstan	
		Tajikistan	

Photo: Pierre/Flickr

LATIN AMERICA & CARIBBEAN

Data-driven assessment

- Wheat and maize flour fortification is mandatory in most countries in Latin America and the Caribbean.
- Yet, our research suggests that standards need to be reviewed to ensure optimal nutritional impact.

Photo: Abe Kleinfeld

Sample Standards in South America

Country	Wheat g/capita/day	Extraction	Iron Compound	Iron (ppm)	Folic acid (ppm)	WHO
Argentina	240	75%	Ferrous sulfate	30	2.2	Y
Bolivia	153	75%	Reduced electrolytic iron	60	1.5	Y
Brazil	146	75%	Reduced iron	42	1.5	N
Chile	305	75%	Ferrous sulfate	30	2.2	Y
Colombia	80	75%	Ferrous fumarate, sulfate or reduced iron	45	1.5	N
Ecuador	104	75%	Reduced iron	55	0.6	N
Peru	148	75%	Ferrous fumarate or ferrous sulfate	55	1.2	Close
Uruguay	336	75%	Ferrous sulfate and fumarate	30	2.4	High
Venezuela	144	75%	Ferrous fumarate or equivalent	20	0	Low

LATIN AMERICA & CARIBBEAN

Strategic targets

FFI is exploring support for 26 countries, pending additional funding.

EXPLORE & ENGAGE			
Argentina	Costa Rica	Honduras	Trinidad and Tobago
Bahamas	Cuba	Jamaica	Uruguay
Barbados	Dominican Republic	Mexico	Venezuela
Belize	Ecuador	Nicaragua	
Bolivia	El Salvador	Panama	
Brazil	Guatemala	Paraguay	
Chile	Guyana	Peru	
Colombia	Haiti	Suriname	

Photo: Abe Kleinfeld

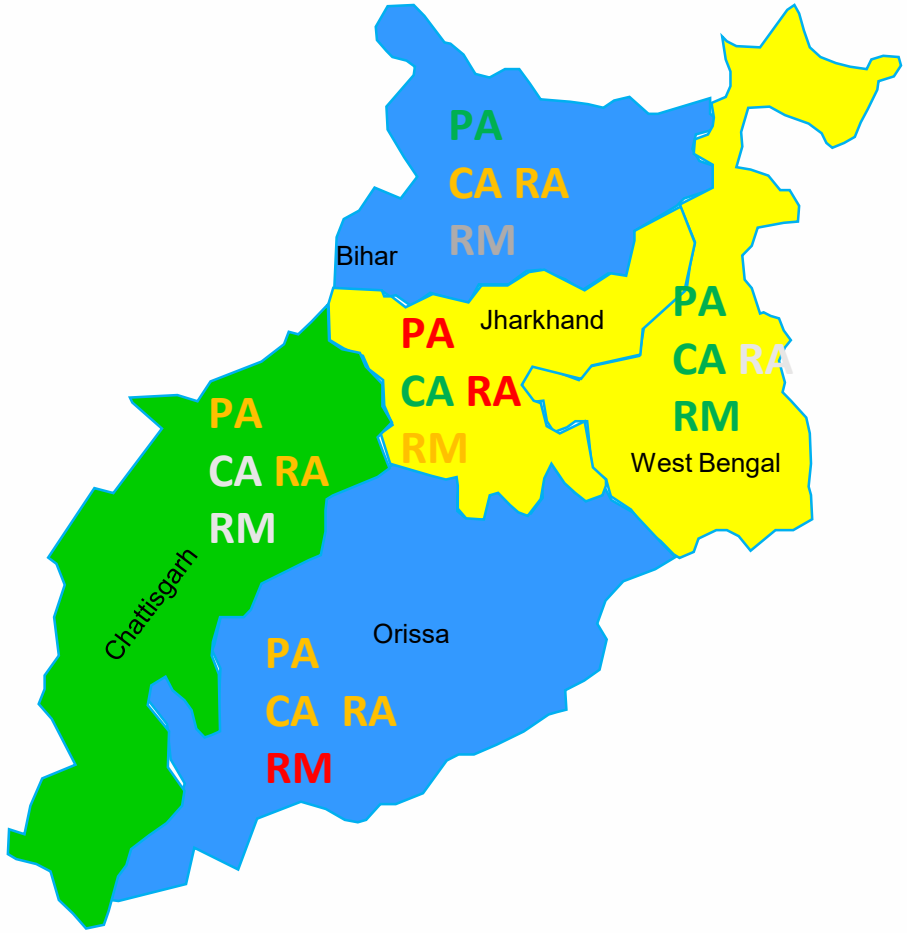
INDIA

Data-driven assessment

- Assessment of 28 states and 7 territories via:
  - Database analyses
  - Creation of state profiles
  - Socio-cultural assessment
  - Partner interviews and mapping
- Priority tiers were identified through:
  - Potential health impact
  - Market analyses
  - Industry analyses
  - Assessment of grain availability and consumption
  - Assessment of fortification environment for wheat and rice

Photo: Adam Cohn

FFI Strategic Approach: Rice & Wheat



Rice Legend

- First Priority State
- Second Priority State
- Third Priority State

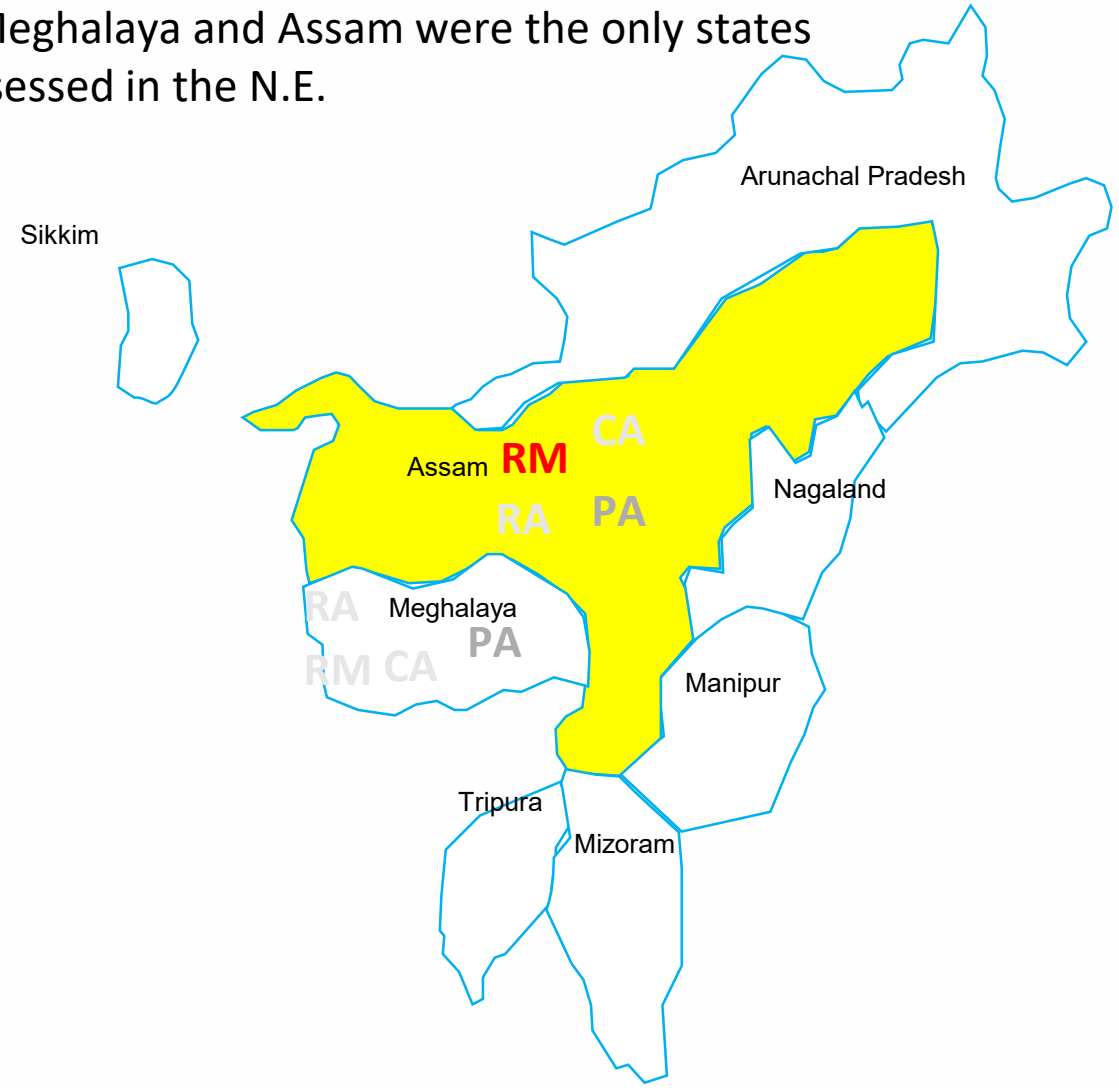
Wheat Channel Legend

PA = PDS Atta
CA = CCM Atta
RA = RFM Atta
RM = RFM Maida

No reachable pop.
Low ranking
Low-intermediate
Intermediate-high
High ranking

FFI Strategic Approach: Rice & Wheat

*Meghalaya and Assam were the only states assessed in the N.E.



Rice Legend

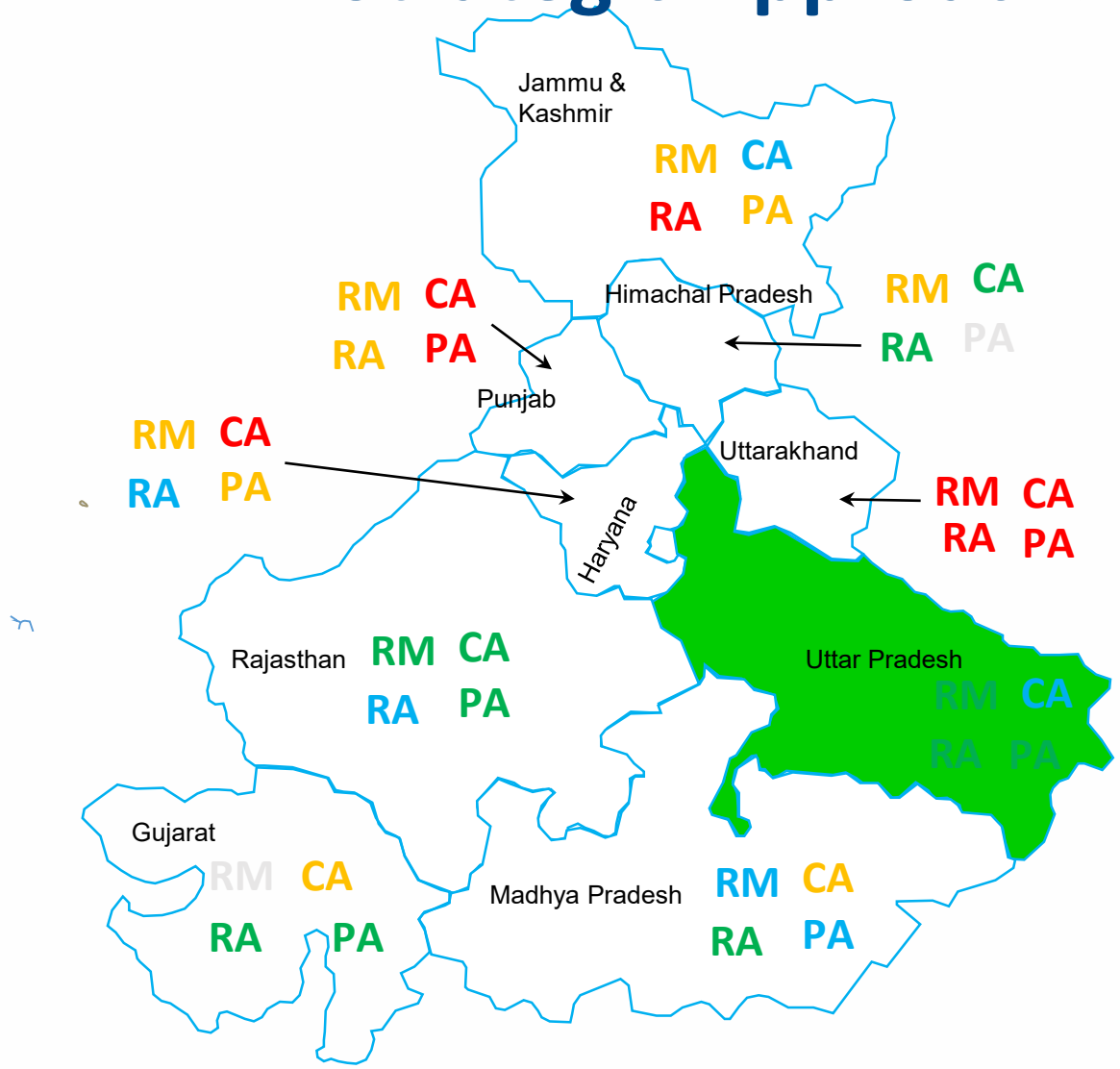
- First Priority State
- Second Priority State
- Third Priority State

Wheat Channel Legend

PA = PDS Atta
CA = CCM Atta
RA = RFM Atta
RM = RFM Maida

No reachable pop.
Low ranking
Low-intermediate
Intermediate-high
High ranking

FFI Strategic Approach: Rice & Wheat



Rice Legend

- First Priority State
- Second Priority State
- Third Priority State

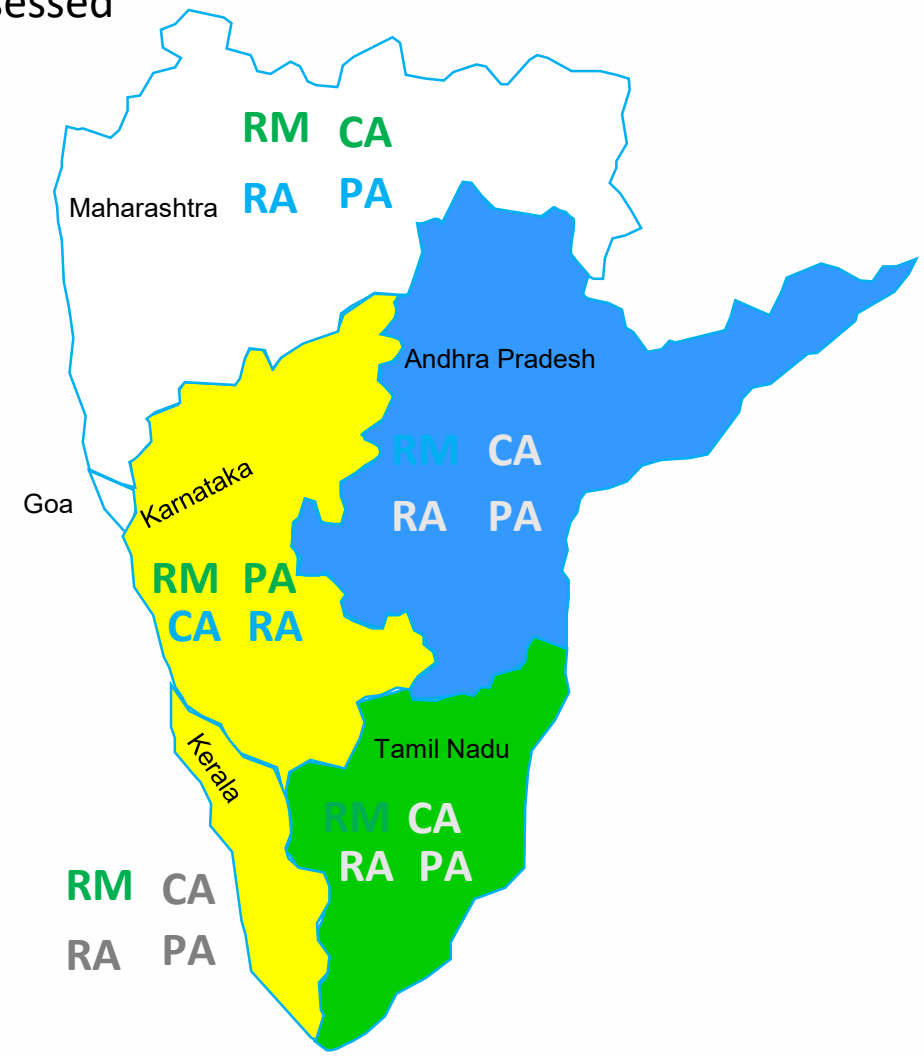
Wheat Channel Legend

PA = PDS Atta
CA = CCM Atta
RA = RFM Atta
RM = RFM Maida

No reachable pop.
Low ranking
Low-intermediate
Intermediate-high
High ranking

FFI Strategic Approach: Rice & Wheat

*Goa not assessed



Rice Legend

- First Priority State
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- Third Priority State

Wheat Channel Legend

PA = PDS Atta
CA = CCM Atta
RA = RFM Atta
RM = RFM Maida

No reachable pop.
Low ranking
Low-intermediate
Intermediate-high
High ranking

INDIA

Strategic targets

FFI is targeting 18 states in India, including the scale-up of fortified atta in all social safety net programs in Haryana. Pending additional funding, FFI will prioritize support for 17 additional states.

EXPLORE & ENGAGE		MAP THE CONTEXT	DESIGN & DEVELOP	MONITOR FOR COMPLIANCE & IMPACT
Andhra Pradesh	Karnataka	Maharashtra	Haryana	
Bihar	Kerala	Rajasthan		
Chhattisgarh	Madhya Pradesh	West Bengal		
Gujarat	Odisha			
Himachal Pradesh	Punjab			
Jammu & Kashmir	Tamil Nadu			
Jharkhand	Uttar Pradesh			

Photo: Adam Cohn

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