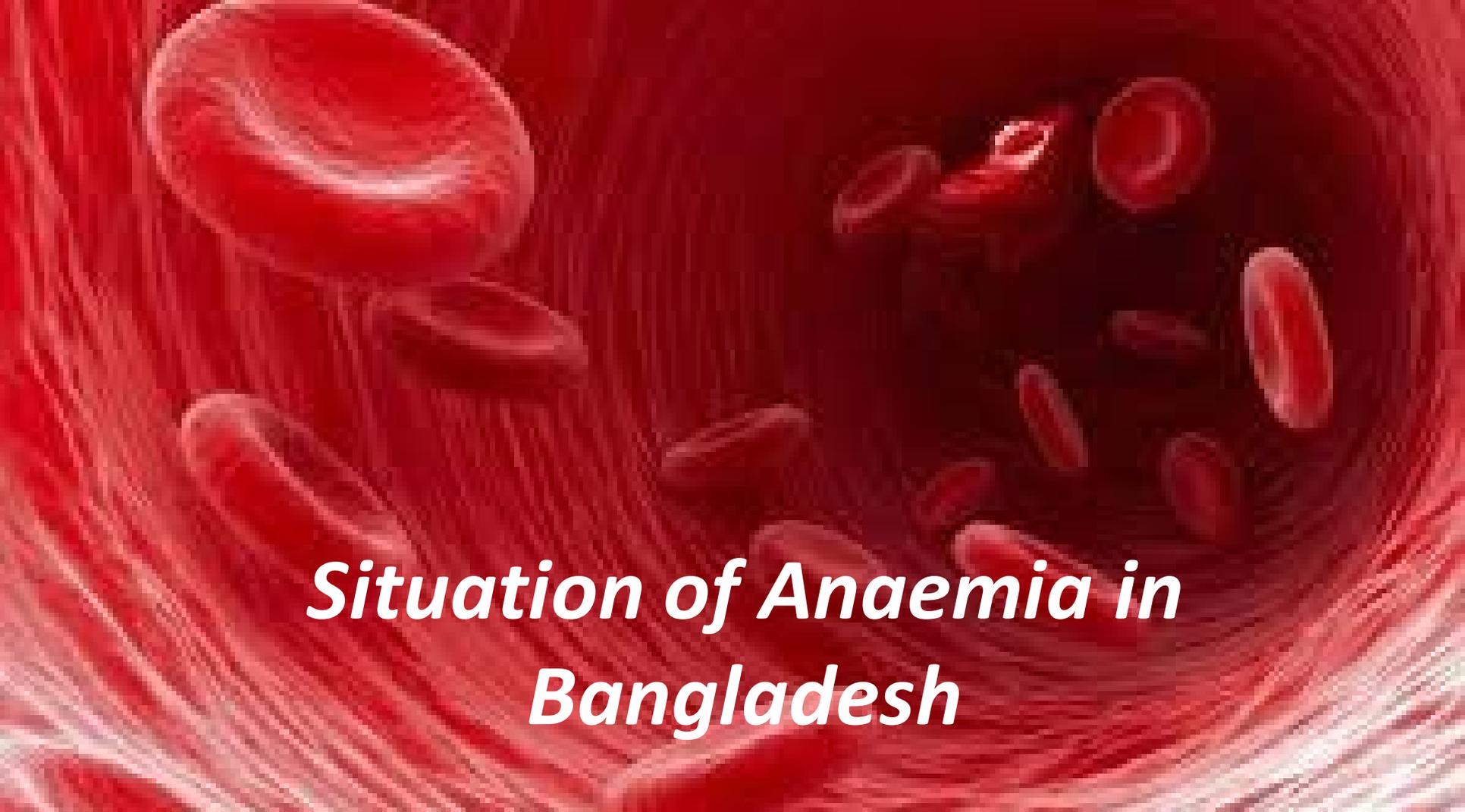




# Webinar on

## Recognizing the Complexity of Anaemia in Bangladesh and Developing Effective Strategies through National Consultation



A microscopic view of a blood vessel showing numerous red blood cells (erythrocytes) in motion. The cells are biconcave discs, and the vessel walls are visible as a textured, reddish-brown structure. The overall color palette is dominated by various shades of red and pink.

# *Situation of Anaemia in Bangladesh*

**Ireen Akhter Chowdhury**

Nutrition Officer (Micronutrient)

UNICEF Bangladesh



# Presentation Outline

- The prevalence of anaemia and iron deficiency (ID) in Bangladesh
- Understanding groundwater iron
- Studies linking groundwater iron and iron deficiency anaemia (IDA)
  - JiVita
  - INFS/ UNICEF

# Anaemia is still a public health problem in Bangladesh

## *Prevalence of Anaemia in Different Surveys*

National Surveillance Project 2001*	Bangladesh Demographic Health Survey 2011*	National Micronutrient Survey 2011-12**
<b><i>Under 5 children</i></b>		
47% (6-59 mons)	51% (6-59 mons)	33% (6-59 mons)
		45% (6-23 mons)
<b><i>Children aged 6-11 years</i></b>		
		19% (6-11 y)
<b><i>Women 15-49 years</i></b>		
33.2% (women 15-49 yrs)	42% (women 15-49 yrs)***	26% (NPNLW 15-49 yrs)

\*HemoCue Rapid Testing Method using capillary blood

\*\*HemoCue Rapid Testing Method using venous blood

\*\*\* Ever married women 15-49 yrs

# Anaemia and Iron Deficiency Anaemia in Bangladesh<sup>2</sup>



## National Micronutrient Survey 2011-12



Institute of Public Health Nutrition  
Directorate General of Health Services  
Ministry of Health and Family Welfare  
Government of the People's Republic of Bangladesh



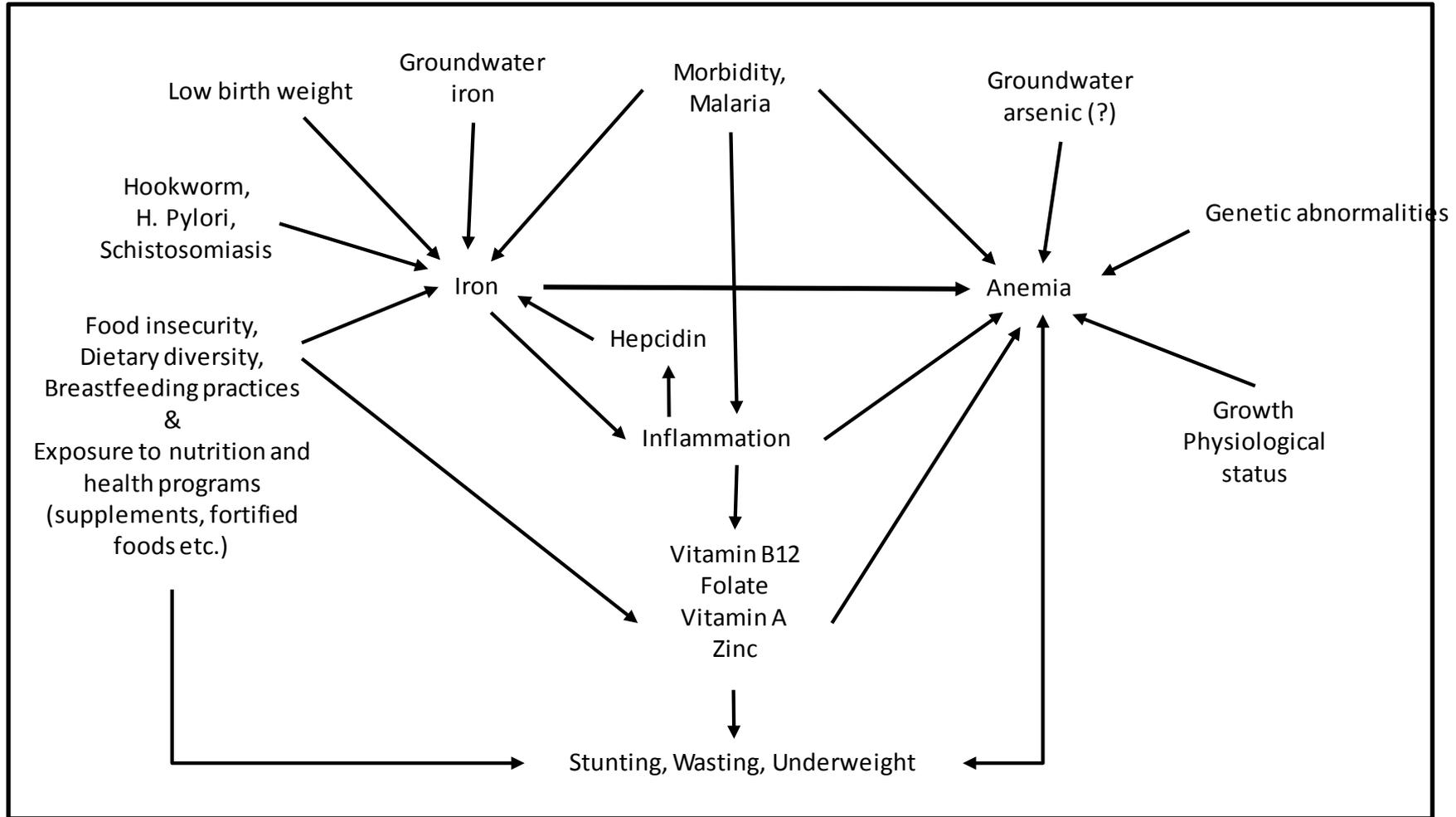
	Anaemia (%)	Iron Deficiency Anaemia (%) <sup>1,2</sup>
<b>Preschool Children</b>	33	7.2
<b>School children (6-11 y)</b>	19	1.3
<b>NPNL Women</b>	26	4.8

<sup>1</sup>Iron deficiency anemia is defined as hemoglobin < 11.5 g/dl plus ferritin level < 15.0 ng/ml in children 6-11 year and hemoglobin < 12.0 g/dl plus ferritin level < 15.0 ng/ml in children 12-14 year,

<sup>2</sup>Estimates weighted to represent at the population level

Ref: Sabuktagin, PHN 2016

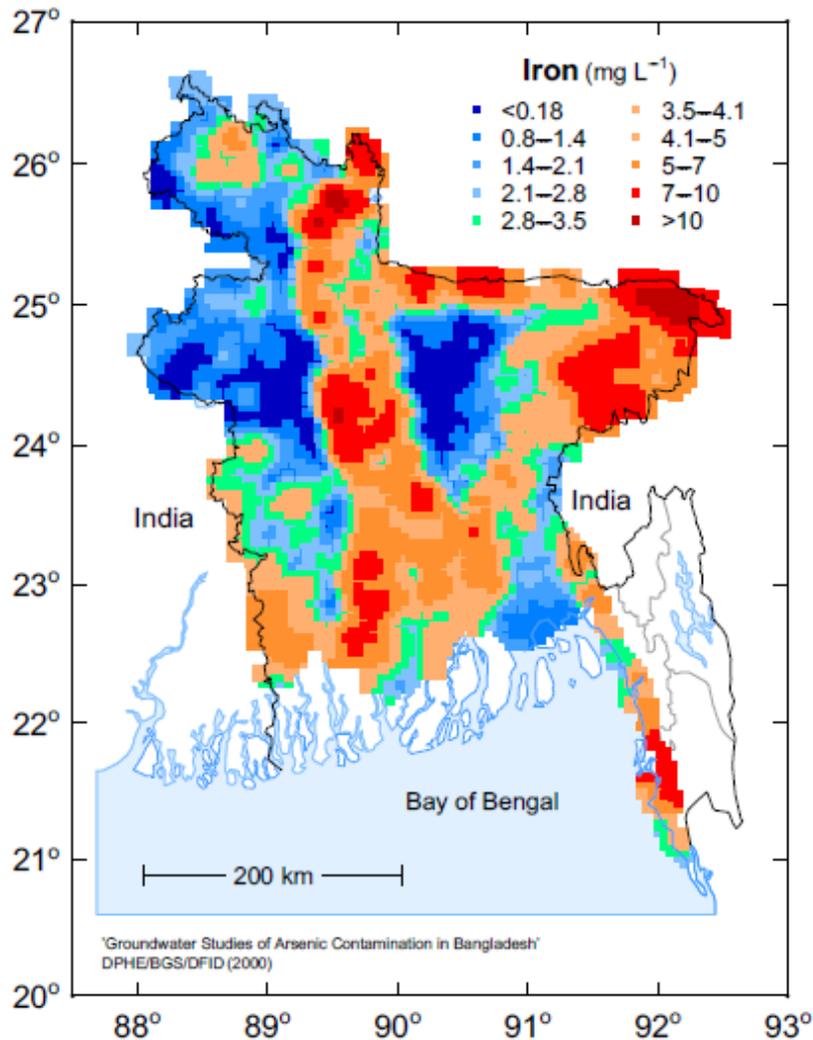
# The etiology of anemia is complex and many details of interrelationship among causes not well understood



***Anaemia may result from a number of causes. Approx. 50% of cases of anaemia are considered to be due to iron deficiency, but the proportion probably varies among population groups and in different areas, according to the local conditions (WHO 2011)***

***In Bangladesh, the contribution of Iron Deficiency to Anaemia is likely to be lower due to bioavailable iron in ground water***

# Distribution of Ground Water Iron in Bangladesh



- The results of the survey of 3534 boreholes from 61 of the 64 districts of Bangladesh
- The range of ground water iron in Bangladesh is <0.004 mg/l to 61.0 mg/l
- Iron is generally high in Bangladesh groundwater, not much difference between shallow and deep groundwater
- Area with groundwater iron concentration defined as “High” ( $\geq 2.8$  mg/l)
- Area with groundwater iron concentration defined as “low” ( $< 2.8$  mg/l)
- Iron concentration is high in most parts of the ground water
- Dissolved iron is predominantly ferrous ( $\text{Fe}^{2+}$ ), a form that is readily absorbed through the intestine

Source: DPHE/BGS National Hydrochemical Survey (1998-99)

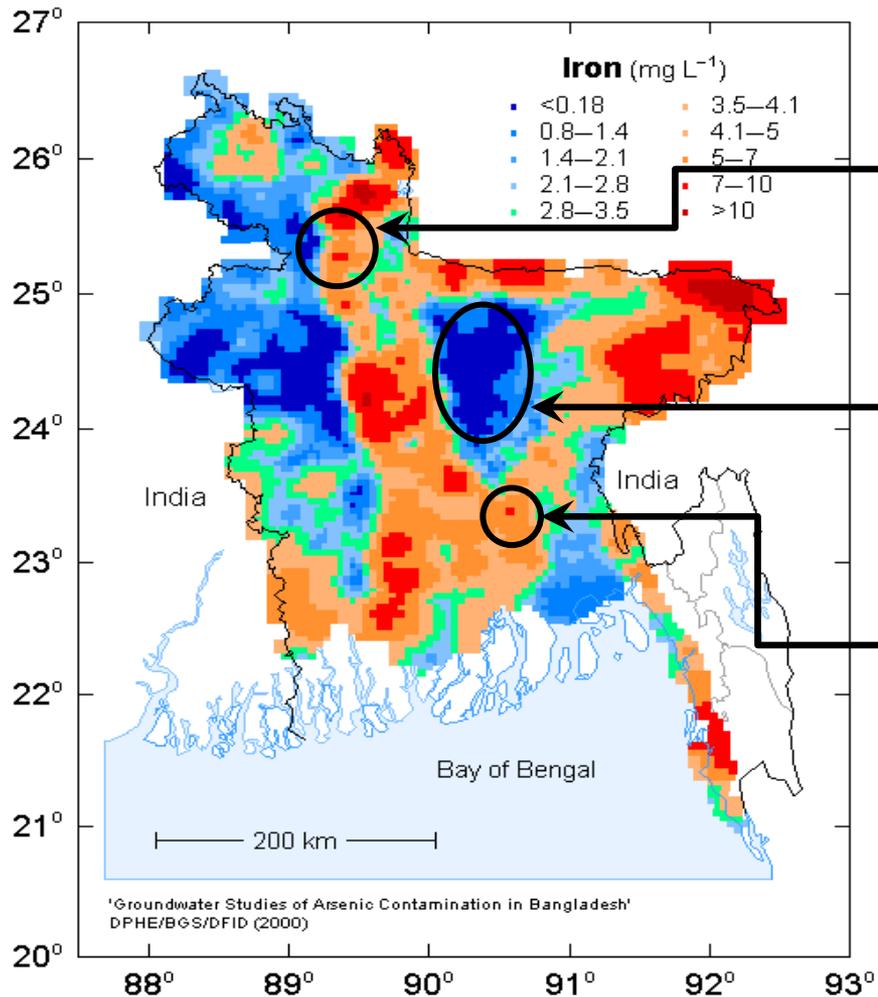
# High iron level in groundwater is associated with higher serum ferritin status (all populations)

	Serum ferritin (ng/ml)		
	<b>Preschool Children</b>	<b>NPNL Women</b>	<b>School-age Children</b>
	mean (SD)		
High Fe area	38.9(1.9)*	67.9(2.3)*	57.1(1.8)*
Low Fe area	23.1(1.9)	44.7(2.2)	42.1(1.6)

\*P<0.001

Sabuktagin, PHN 2016

# Other studies also confirmed association between ground water iron and low prevalence of iron deficiency and iron deficiency anemia in Bangladesh



JiVitA Research Project 2012  
Anemia: 21-44%, ID: 1-7%, IDA: <math>< 1-4\%</math>

Khambalia 2009, Hyder 2004  
Anemia: 37-50%, ID: 15-42%, IDA: 11-55%

Matlab, Bangladesh 2011  
Anemia: 28%, ID: 8%, IDA: 2%

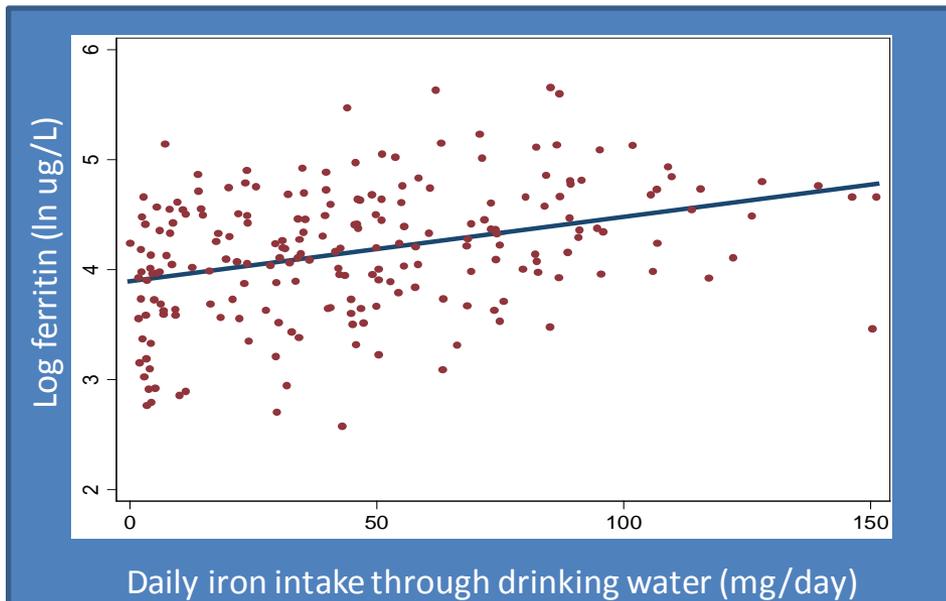
Map: British Geologic Survey, 2001

# PANI (Project of Arsenic N' Iron) in 2006-8: Study of iron and anemia status in non-pregnant women that followed the JiVitA-1 Trial

## *Groundwater Iron Intake was Associated with Iron Status of Women (n=207)*

PANI study reported that

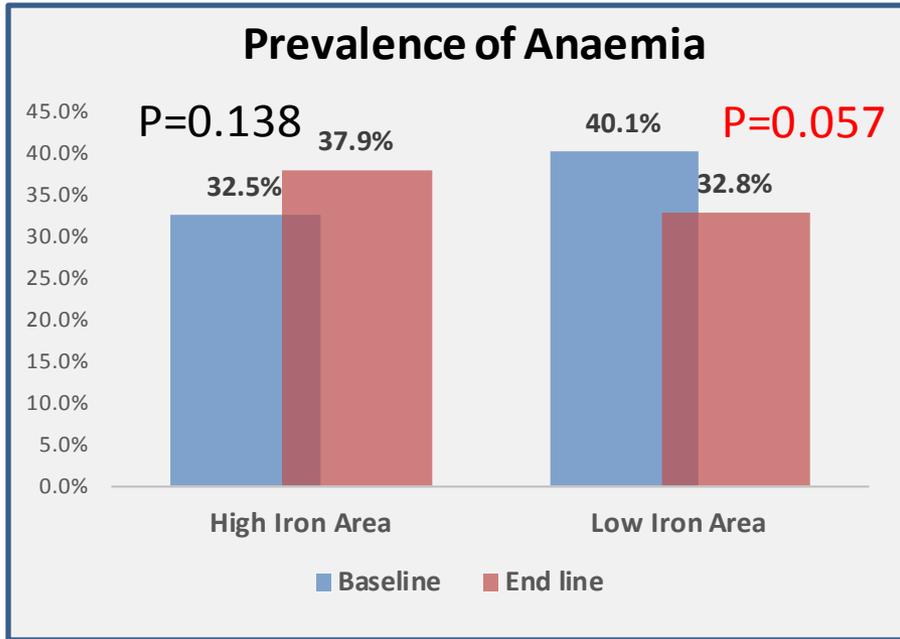
- Median Iron intake from water was 42mg/day (Range: 0.0, 150.4)
- Anaemia was common but not the result of iron deficiency.
- Dietary intakes of heme-iron and non-heme iron food sources were modest.
- Women maintained adequate iron stores most likely as a result of natural iron in groundwater.
- Thalassemia (28%) was an important cause of anaemia



### Interpretation:

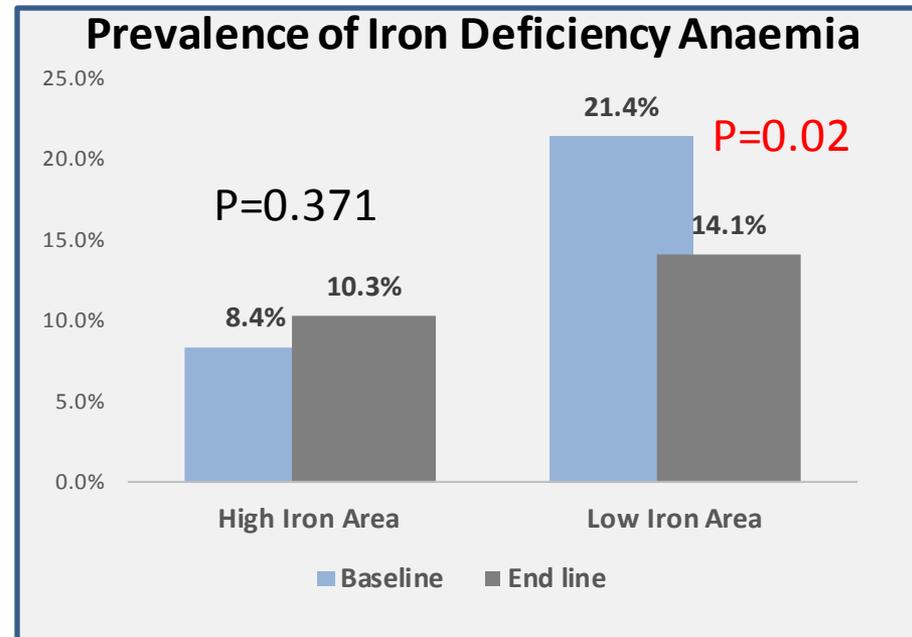
**For every 10 mg/day increase in iron intake through water, ferritin concentration is expected to be 6% higher (95% CI 4% to 8%)**

# Study to Assess Anaemia and Iron Deficiency in Pregnant Women Living in Areas of Low and High Iron in Ground Water: Implications for IFA Supplementation



A significant proportion of pregnant women in areas of both LGWI and HGWI remained anaemic after IFA supplementation for 3.5 months, even after excluding the subjects with haemoglobinopathies from analysis.

Prevalence of IDA decreased significantly in the pregnant women only in areas of LGWI

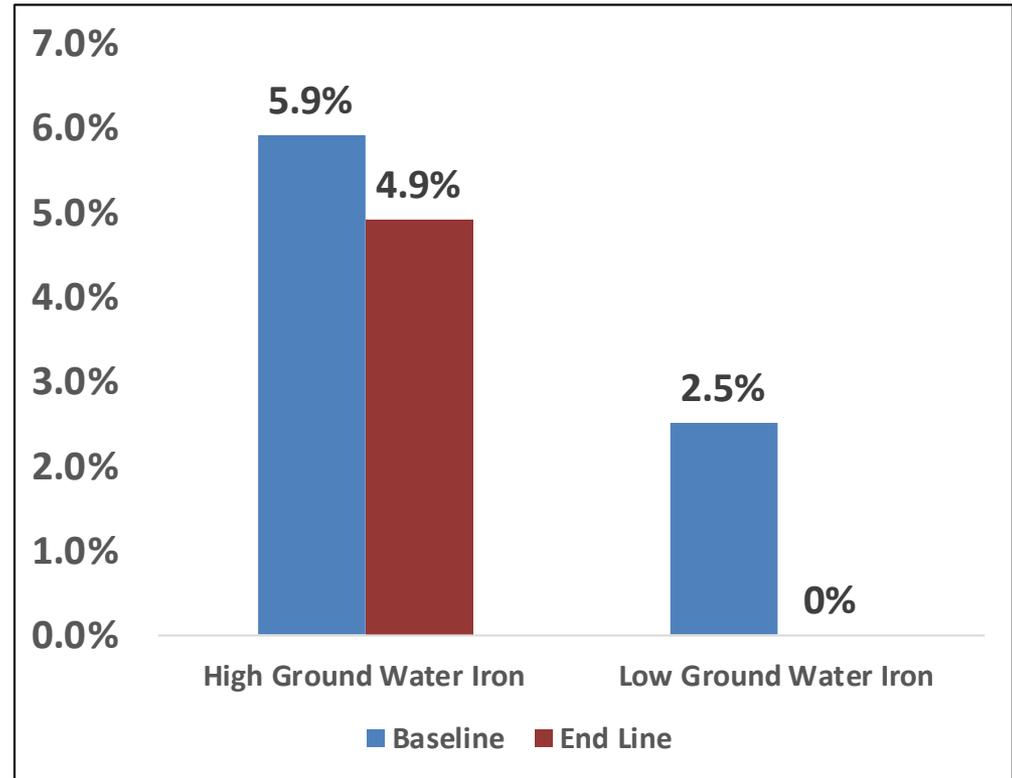


LGWI: Low Ground Water Iron  
HGWI: High Ground Water Iron

Source: UNICEF/INFS Study 2016

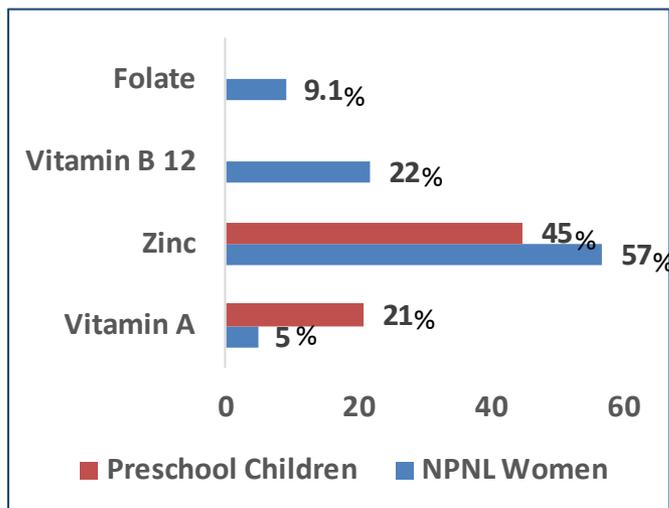
# Iron-Folic Acid Supplementation among Pregnant Women: Haemoconcentration and Iron Overload

**Among pregnant women, routine IFA supplementation with 60 mg elemental iron and 400 µg folic acid, does not pose any significant risk of haemoconcentration and iron overload**

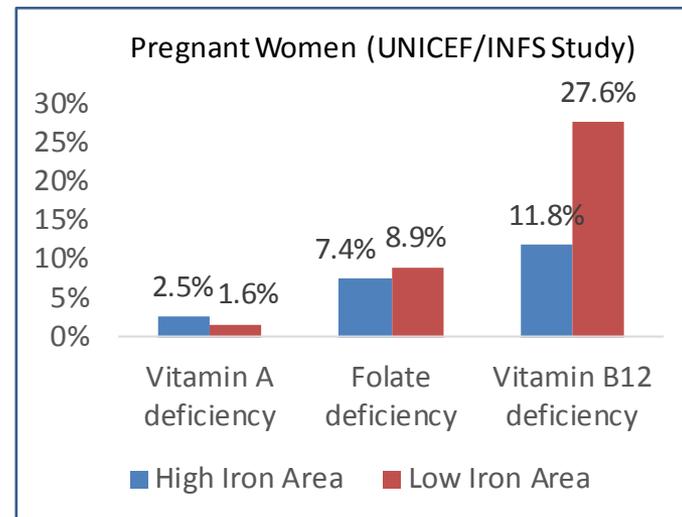


Source: UNICEF/INFS Study 2016

# If iron deficiency anaemia is not major cause, what are the other important causes of high prevalence of anaemia in Bangladesh?



Multiple micronutrient deficiencies



In Bangladesh, the role of vitamin A is **as large as iron** to influence the haemoglobin outcome

## Effect Size for Iron and Vitamin A on Haemoglobin

Standardized effect size ( $\beta$ )

	PSAC	SAC	NPNLW
S. ferritin	0.21	0.11	0.13
S. retinol	0.13	0.14	0.13

# If iron deficiency anaemia is not major cause, what are the other important causes of high prevalence of anaemia in Bangladesh?

## Genetic Red Blood Cell Disorders

- **No** nationally representative prevalence data of thalassemia
- **WHO estimates for Bangladesh:** Thalassaemia trait (3%), Haemoglobin E disease: 4%
- In a Northern district: **28%** among women (**R Merrill, APJCN 2012**)
- Two northern and two southern sub districts (**17.2%** in pregnant women) (**UNICEF/INFS study 2016**)

A decorative header image showing several red blood cells in a dark red, slightly blurred background.

***Outcomes from the National Anemia  
Consultation in Bangladesh***

**Rae Galloway**  
Independent Consultant

# National Anaemia Consultation in Bangladesh

*Technical consultation held during 24-25 July, 2016 in Dhaka, Bangladesh*

Supported by:



# National Anaemia Consultation in Bangladesh

## Summary of country level evidence on key issues

### Anaemia, ID and IDA:

- Anemia continues to be a public health problem and Iron Deficiency is not a major public health problem in Bangladesh
- Iron deficiency Anaemia (IDA) explains between 8-30% anaemia in Bangladesh (excluding pregnant women in low groundwater areas) which is lower than what was thought previously
- Iron content in water is positively associated with iron status and inversely associated with anemia
- Anaemia prevalence in children 6-23 months was 45% while all ID was 15%. IDA was about 10% or 25% of all anaemia (NMS 2011-12)
- IDA is still high in pregnant women, confirmed by smaller studies. In one study, IDA was 25% of anaemia in pregnant women living in high iron areas and 50% of anaemia in pregnant women living in low iron areas
- Anaemia is prevalent in adolescent girls in Bangladesh. No national data but some area based information available

# National Anaemia Consultation in Bangladesh

## Summary of country level evidence on key issues

### Thalassemia:

- Thalassemia/hemoglobinopathies is an important composite cause of anemia but its relative contribution to national anaemia prevalence is not known
- Low cost genetic testing should be instituted in the country for screening of thalassemia

### Multiple micronutrient deficiencies (MMD)

- MMD coexist and contribute to maternal anemia, poor maternal health, and adverse pregnancy and infant outcomes
- In Bangladesh, vitamins A and B-12, and zinc deficiencies, which are associated with anemia, are high. The role of vitamin A has as large as iron in improving Hb. (NMS, 2014)
- More efforts to be needed to improve the quality of the diet of children

# National Anaemia Consultation in Bangladesh

## Summary of country level evidence on key issues

### Iron over dose

- IFA with 60 mg of iron may be too high and may be harmful to women living in high iron areas. IFA with 30 mg would meet the needs of pregnant women living in low iron areas
- IFA supplementation does not change the prevalence of anaemia and iron deficiency among pregnant women living in high and low iron ground water areas with 90% consumption coverage for only 3.5 mons
- No information about amount of water consumed by young children 6-23 months when iron requirements are the highest
- Overall coverage of consumption of IFA supplements by pregnant women is low all through the pregnancy period.

# National Anaemia Consultation in Bangladesh

## Recommendations:

### For Children

- Improving iron stores at birth (e.g., delayed cord clamping), ensuring exclusive breastfeeding, and giving iron for LBW babies.
- Scale-up complementary feeding promotion for children 6-23 months including effective integration of multiple micronutrient powders (MNPs)

### For Pregnant Women

- IFAS with lower dose of iron (30 mg) for pregnant women to avoid iron over load where ground water iron is high and strengthen scale up of the program
- Consider replacing IFA with MMS, as guided by the National Micronutrient Strategy

### For Adolescent Girls

- The package of interventions should include nutrition education, deworming, and IFA supplements using multiple platforms and channels to reach them

#### Key areas as next steps

Synthesizing the evidence to identify the aetiology of anaemia and their relative proportion to the causes of anaemia

Operational research to evaluate cost-effectiveness as a next step in guiding the possible adoption of MMS during pregnancy in Bangladesh

Evidence based scale-up complementary feeding promotion for children 6-23 months (adequate amounts and quality of diet) including effective integration of multiple micronutrient powders (MNPs)

# *Implication in policy and program*

**Prof. Nazma Shaheen**

Director, Institute of Nutrition and Food Science  
University of Dhaka



# Policy and Strategy for Anaemia Prevention and Control in Bangladesh

## National Strategy for Anaemia Prevention and Control in Bangladesh



February 2007



Institute of Public Health Nutrition (IPHN)  
Ministry of Health and Family Welfare  
Government of the People's Republic of Bangladesh



## NATIONAL STRATEGY ON PREVENTION AND CONTROL OF MICRONUTRIENT DEFICIENCIES, BANGLADESH (2015-2024)



Institute of Public Health Nutrition  
Directorate General of Health Services  
Ministry of Health and Family Welfare  
Government of the People's Republic of Bangladesh



## National Nutrition Policy 2015

রেজিস্টার্ড নং ডি এ-১

বাংলাদেশ



গেজেট

অতিরিক্ত সংখ্যা  
কর্তৃপক্ষ কর্তৃক প্রকাশিত

রবিবার, অক্টোবর ১৮, ২০১৫

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার  
স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়  
জনস্বাস্থ্য-২ অধিদপ্তর

প্রজ্ঞাপন

তারিখ, ২০ অক্টোবর ১৪২২ বাঙ্গা/০৮ অক্টোবর ২০১৫ খ্রিস্টাব্দ

নং ৪৫.১৬১.০৫৩.০০.০০.০০২.২০১০-৪৪০—গণপ্রজাতন্ত্রী বাংলাদেশ সরকারের স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয় কর্তৃক এবং স্বাস্থ্যবিদ্যায় বিভাগের অনুমোদনক্রমে স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয় নিম্ন শর্তিত "বাংলাদেশ জাতীয় পুষ্টিনীতি ২০১৫" প্রকাশ করিলেন:

জারী পুষ্টিনীতি ২০১৫

পুষ্টি উন্নয়নের সুনিয়ম

শিরোনাম : বাংলাদেশ জাতীয় পুষ্টিনীতি-২০১৫

১। ক্ষুধিকা

পুষ্টি হারিয়ে যাওয়ার প্রয়োজনীয় শারীরিক বৃদ্ধি, মানসিক বিকাশ ও জটিল বাস্তুসংস্থের ভরস্বপূর্ণ নিয়ামক। পুষ্টির অভাবে মাতৃস্বাস্থ্যে শিশুর স্বাস্থ্যিক বৃদ্ধি হ্রাস পায়, শিশুর জন্ম-ওজন কম হয়। স্বর্ভোগ, কুশলতা, কম ওজন ও অনুপুষ্টি-ক্যাশ্বাতি এদের অনুপস্থিতিই পুষ্টিহীনতা। শিশুস্বাস্থ্যের অন্যতম প্রধান কারণ এই অনুপুষ্টি। অনুপুষ্টি ও মানসিক বিকাশ ব্যাহত করে। পুষ্টিহীন পিতৃ-মাতৃদের সীমাবদ্ধতা নিয়ে বেড়ে ওঠে, ফলে পরিণত বয়সে তারা পক্ষে সমাজ ও জাতির উন্নয়নে যথেষ্ট অবদান রাখা সম্ভব হয় না।

(১৪০১)

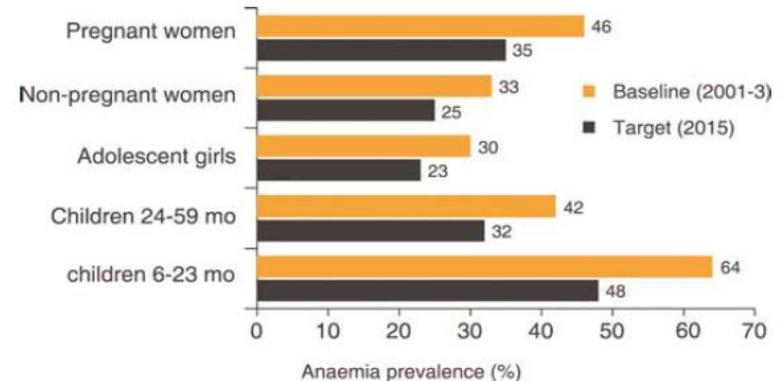
মুদ্রা : টাকা ১৬.০০

# National Strategy for Anaemia Prevention and Control in Bangladesh 2007

## Overall goal:

To reduce by one quarter the prevalence of anaemia among high-risk groups of Bangladesh by 2015, based on the anaemia prevalence in 2001-3 for different target groups.

## Target to reduce anaemia by 2015



\*Source baseline data: BBS/UNICEF (2004)

## Recommended Strategies

Targeted strategies for high risk group:

1. Micronutrient supplementation
2. Dietary improvement
3. Parasitic disease control
4. Family planning and safe motherhood

Population based strategies:

1. Food fortification
2. Production of micronutrient rich foods through household food production, crop diversification, biotechnology and biofortification

# National strategy on prevention and control of micronutrient deficiencies, Bangladesh 2015-2024

Anaemia and iron deficiency is one of the major area that is addressed by this strategy; Recommended strategies.....

- 1. Policy guideline and legislation:** Reviewing policy on IFA Supplementation for Adolescent and NPWL women; Considering policy on micronutrient supplementation during pregnancy; Need based targeted MNP supplementation for children aged 6-23 months
- 2. Intervention program:** Supplementation as Short-term approach, Food fortification as a medium- to long-term approach and Improving dietary diversification
- 3. Partnership and coordination:** Increasing coordination between ministries and partner organizations for IFA and MNP supplementation
- 4. Capacity building:** In national, regional, district, facility and community level
- 5. Advocacy and communication:** Priority actions are set for target audience: policy makers, key ministries, private sector, general population, service providers, development partners
- 6. Monitoring, evaluation and research:** For IFA and MNP supplementation more research is needed to modify the current program, evaluate the program

# Anaemia Control Programs in Bangladesh

## **For Children aged 6-59 months:**

- Nationwide, under five children are not routinely given any intervention to prevent and control anaemia
- Only moderate and severe anaemic children are receiving treatment at Upazila Health Complexes, district and divisional hospitals following WHO guideline
- Bi-annual de-worming of children aged 24-59 months
- MNP supplementation integrated with IYCF for children aged 6-23 months in 91 Upazilas

## **For School age children (6-11 yrs)**

- Bi-annual de-worming through school

## **For Adolescent girls (10-19 yrs):**

- IFA supplementation two tablets in a week for three months
- Bi-annual de-worming of adolescent

## **For Pregnant women:**

- Daily IFA supplementation throughout the pregnancy

## **For Lactating women:**

- Daily IFA supplementation for three months

# What is next for Bangladesh?

- Review dosage of iron in IFA
- Introduce MMS for pregnant mothers
- Continue MNP for children
- Ensure that IFA supplementation is not only single approach to reduce anaemia; other programs needed like
  - Parasitic disease control,
  - Diet quality improvement and
  - Food fortification;
- Strengthen coverage and reach with supplementation for targeted groups:
  - Adolescent girls and newly wed women in more remote locations
  - Improve programs that distribute IFA to women
  - Ensure adequate tablets are provided and women counseled to take supplements



Thank you