

# Micronutrient Powder (MixMe™) Program for Under-fives and Pregnant and Lactating Women Affected by Cyclone Sidr in Bangladesh (ASIA)



“Whether refugees are fleeing war, floods are washing away homes or drought is destroying farmland, hunger is often the first emergency.”

World Food Programme (WFP)

Map created by Salahuddin Ahmed



Capital:	<b>Dhaka</b>
Population:	<b>153,546,896</b>
Population Density:	<b>1,045 per km<sup>2</sup></b>
Unemployment Rate:	<b>2.5%</b> (not considering underemployment estimated at 32%)
Life Expectancy at Birth:	<b>63.21 years (total population)</b>
GDP per Capita (PPP):	<b>US\$1,500</b>
Infant Mortality Rate:	<b>47 deaths / 1,000 live births</b>
Literacy Rate:	<b>43.2%</b>

### WHAT IS AN EMERGENCY?

Emergencies are defined by the World Food Programme (WFP) as urgent situations in which there is clear evidence that an event or series of events has occurred which causes human suffering or imminently threatens human lives or livelihoods and which the government concerned has not the means to remedy. It is a demonstrably abnormal event or series of events which produces dislocation in the life of a community on an exceptional scale. For example:

- Sudden calamities such as earthquakes, floods, locust infestations and similar unforeseen disasters;
- human-made emergencies resulting in an influx of refugees or the internal displacement of populations or the suffering of otherwise affected populations;
- food scarcity conditions owing to slow-onset events such as drought, crop failures, pests and diseases that result in an erosion of communities' and vulnerable populations' capacity to meet their food needs;
- severe food access or availability conditions resulting from sudden economic shocks, market failure, or economic collapse that results in an erosion of communities' and vulnerable populations' capacity to meet their food needs.

### Micronutrients in emergencies

Micronutrients are essential for survival, optimal pregnancy outcomes, for increasing immunity, physical strength and productivity, and promoting good cognitive ability. Populations affected by an emergency are particularly vulnerable to micronutrient deficiencies, because of pre-existing deficiencies and a greater need for micronutrients due to increased risk of infectious diseases including diarrhea. In addition, they are more likely to consume an unbalanced diet because livelihoods and food crops are lost and food supplies are interrupted. For these reasons it is essential to ensure that the micronutrient needs of people affected by a disaster are adequately met. As a result, the WFP, WHO and UNICEF issued a joint statement ([http://www.who.int/nutrition/publications/WHO\\_WFP\\_UNICEF\\_statement.pdf](http://www.who.int/nutrition/publications/WHO_WFP_UNICEF_statement.pdf)) that micronutrients should be part of the response provided to populations affected by an emergency. Particularly young children (6-59 months) and pregnant and lactating women should primarily be targeted because of their greater vulnerability compared to the rest of the population.



A program field staff member asking the mother the number of MixMe™ sachets received.

Inset: Women in the village affected by Cyclone Sidr awaiting the distribution of MixMe™ sachets by WFP.

## Cyclone Sidr response: distribution of Micronutrient Powders

Cyclone Sidr was the fourth named storm of the 2007 North Indian Ocean cyclone season and made landfall in Bangladesh on November 15th 2007, wreaking havoc and causing massive loss of life and the displacement of hundreds of thousands of individuals and families.

WFP responded to the emergency with food assistance. As part of the overall program, the provision of a micronutrient powder (MNP) in 4 districts aimed to reach 50% of the children aged 6 months to 5 years (approximately 100,714 children) and 50% of the pregnant and lactating women (approximately 59,439 women) from the population of 2.2 million people receiving food assistance in 9 districts in the southern coastal region severely affected by Cyclone Sidr. It is interesting to note that even during normal years, wasting rates in this region normally peak in May-June at about 15%, reflecting a seasonal peak in food insecurity in the months leading up to the harvest. This indicates that many of the beneficiaries would potentially already have had a marginal nutritional status.

The additional micronutrients provided by MNP were expected to reduce the prevalence and severity of micronutrient deficiencies, which would then strengthen the immune system, reduce anemia and support cognitive and physical development. In addition, WFP would carefully document lessons learned from integrating MNP provision in an emergency operation so as to define a strategy for future large scale implementation.

Distribution of the MNP was initiated in July and August 2008 and targeted children received 1 box with 100 sachets, while pregnant and lactating women received 2 boxes with a total of 200 sachets. Children were to consume one single serving sachet every other day and pregnant and lactating women 2 sachets every other day. Therefore, the MNPs distributed gave each beneficiary a 7 month supply.

MNP distribution to some 160,153 people was part of a comprehensive 13-month relief and rehabilitation assistance program to those affected by Cyclone Sidr, that included the provision of a general food ration, emergency school feeding and cash and food for work activities. DSM announced at the 2008 World Economic Forum in Davos that it would donate the 22 million sachets of MixMe™ required for the program together with the funding for implementation in addition to its existing WFP-DSM partnership.



Households in the area affected by Cyclone Sidr

The distribution of MNP could not start immediately after the cyclone hit because supplies were not readily available, micronutrient composition had to be decided and agreed upon by all partners and permission obtained from the Government of Bangladesh for its composition. In addition implementation requires partnerships and so the necessary agreements need to be drawn up and signed and logistics agreed. Moreover awareness needed to be raised about both the MNP product and home-fortification as both concepts were unfamiliar to the population, which also required development and production of social marketing / training materials. The intervention was a once-off distribution of the MNP sachets, but households were visited at intervals to emphasize the importance of continued use of the MNP.

## Assessing the impact of Micronutrient Powders in improving lives

Although the efficacy of home fortification with MNP has been extensively tested it had not been integrated with a large scale emergency response and so this setting provided the ideal opportunity. This MNP program in Bangladesh is one of the five large-scale MNP implementation programs piloted by WFP in partnership with DSM. The other sites are Rohingya refugee camp also in Bangladesh; Bhutanese refugees in Nepal; Kakuma refugee camp in Kenya and a program among children under the age of five years in Nepal that will be launched in 2009.

The table opposite shows the composition of the product designed to meet the needs of this specific group. The formulation provides an amount of 1 recommended nutrient intake (RNI) for children aged 1-3 years and two sachets provide an amount close to the RNI for pregnant and lactating women. Vitamin A and iodine content was reduced taking into consideration the additional amount provided by fortified oil and salt in the general food ration. The regular provision of iron and folic acid supplements to pregnant women was to continue as the MNP dosage would not provide sufficient iron and folic acid to meet all the needs during pregnancy.

Micronutrient powder formulation for Cyclone Sidr

Nutrient	Unit	Joint Statement UNICEF/WHO/WFP <5 years No fortified food available Non malaria area	Amount per 1g sachet	%RNI* Ages 1-3 years
Vitamin A	µg RE	400.0	100.0 <sup>1</sup>	25
Vitamin D	µg	5.0	5.0	100
Vitamin E	mg	5.0	5.0	100
Thiamine	mg	0.5	0.5	100
Riboflavin	mg	0.5	0.5	100
Niacin	mg	6.0	6.0	100
Pyridoxine	mg	0.5	0.5	100
Vitamin B12	µg	0.9	0.9	100
Folic Acid	µg	150.0	150.0	100
Vitamin C	mg	30.0	30.0	100
Iron	mg	10.0	10.0	100
Zinc	mg	4.1	4.1	100
Copper	mg	0.56	0.34 <sup>2</sup>	100
Selenium	µg	17.0	17.0	100
Iodine	µg	90.0	30.0 <sup>1</sup>	33

\*RNI = Recommended Nutrient Intake (WHO/FAO 2004).

<sup>1</sup> Reduced because fortified foods provided by WFP already contribute a considerable amount.

<sup>2</sup> Reduced to US RDA because the upper limit for intake by 1-3 year olds is 1 mg.

The MNP was branded as 'Pushtika' which is commonly associated in Bangladesh with being something nutritious. An extensive social marketing campaign using trainers specifically trained on Pushtika was an important part of the program in order to address potential barriers to use of the MNP. The MNP could be added to ready-to-eat food such as a semi-solid porridge, a solid meal or gruel and should be added to the bowl or plate of food immediately before consumption.

Monitoring (prior to the start of distribution and then 2 months, 4 months and 6 months after the program was initiated) assessed the number of MNP received and distributed as well as acceptance, consumption and storage of MNP, and knowledge on anemia and vitamins amongst the beneficiaries. The assessment at 2 months post distribution showed that the awareness of Pushtika was exceptionally high, with 81.8% of the 610 people surveyed having heard of it. In addition, the usage of Pushtika showed that 87.2% of the 227 pregnant and lactating women and 67.4% of 258 children surveyed had used more than 40 and 20 sachets respectively (the amount to be consumed in ~1.5 months).

The second round of monitoring, conducted 4 months after the distribution, showed that the proportion of beneficiaries consuming the sachets remained high (80% among pregnant women, 82% among lactating mothers and 85% among children). The proportion of mothers who stated their children had become healthier after consuming the MNP was higher than after the 2 months monitoring – 45.7% compared to 39.7%. Also, the proportion of mothers who claimed that their children's weight had increased nearly tripled (13.6% in the first monitoring and 38.5% in the second monitoring round). The higher percentages of positive responses to the benefits of Pushtika could be the result of increased consumption due to the extensive social marketing efforts.

**Home-fortification refers to a strategy where essential vitamins and minerals are added to prepared food just before consumption. The advantage is that the micronutrients can be well-targeted and dosed, and they are not subject to processing and preparation that could reduce their content and/ or bioavailability.**



*Micronutrient powder (MixMe™) being added to the plate of ready-to-eat food*

A cross-sectional survey, including assessment of hemoglobin levels, was conducted in February 2009 amongst children under 5 years and lactating women as well as adolescent girls who were not eligible to receive the MNP. Comparison groups for each were drawn from other WFP assisted areas that were also affected by the cyclone, but did not receive MNP. The survey will therefore allow comparisons to be made between the groups in the two areas to assess impact and effectiveness of the MNP on reducing anemia. Final results on the success of the program are expected by mid 2009.

## More information

For further information on the MNP Program, please contact:

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### FACTS TO REMEMBER ABOUT ASSESSING MICRONUTRIENT POWDER EFFECTIVENESS

- Anemia prevalence (or hemoglobin concentration) might not be considered appropriate as the single criteria to use in the assessment of the efficacy of an MNP, because MNP also impacts on other micronutrient deficiencies.
- Hemoglobin concentration, which can be improved by consuming MNP, is not only affected by nutritional factors but also by inflammation, worm infestation, malaria, HIV/AIDS and iron stores of the child at birth. Thus, the degree to which MNP can reduce anemia depends on the extent to which it is caused by micronutrient deficiencies versus other factors.
- Surveys that are often used in program settings (cross-sectional, no control group) may not be appropriate to assess effectiveness of MNPs and questionnaires administered to participants or caregivers could lead to a biased response, highlighting the importance of survey design.
- Anti-nutrients such as phytate from unrefined cereals or tannins from tea are powerful iron absorption inhibitors and need to be considered when formulating the MNP, designing social marketing messages and planning the evaluation of its impact.