

Atoms for Nutrition: Enhancing Diet Quality with Nuclear Technology

Emorn Udomkesmalee

Institute of Nutrition, Mahidol University, Thailand



28-29 September 2016

2016 IAEA Scientific Forum

**Nuclear Technology for
the Sustainable Development Goals**



Nutrition is central to the SDGs



Tackle malnutrition—in **all** its forms

the **NEW** **NORMAL**

Nearly half of surveyed countries currently experience serious levels of both undernutrition and adult obesity.



WE MUST END MALNUTRITION—IN ALL ITS FORMS—BY 2030. **#NUTRITIONREPORT**



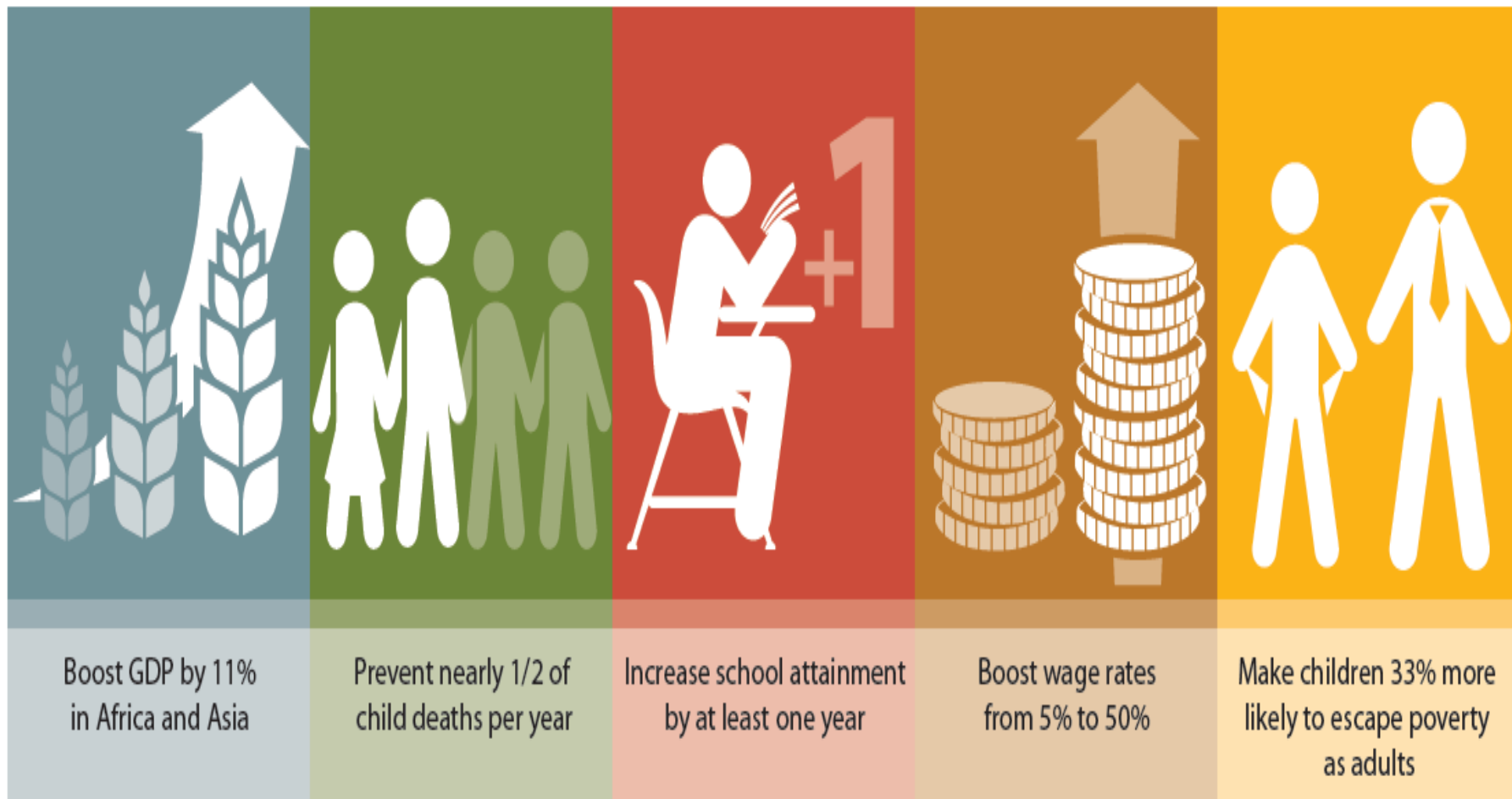
Malnutrition Burdens

OUT OF A WORLD POPULATION OF 7 BILLION	<ul style="list-style-type: none">• About 2 billion people (1.9b) suffer from micronutrient malnutrition• Nearly 800 million (794m) people suffer from calorie deficiency
OUT OF 5 BILLION ADULTS WORLDWIDE	<ul style="list-style-type: none">• Nearly 2 billion (1.9b) are overweight or obese• 1 in 12 has type 2 diabetes
OUT OF 667 MILLION CHILDREN UNDER AGE 5 WORLDWIDE	<ul style="list-style-type: none">• 159 million under age 5 are too short for their age (stunted)• 50 million do not weigh enough for their height (wasted)• 41 million are overweight

FIGURE

1

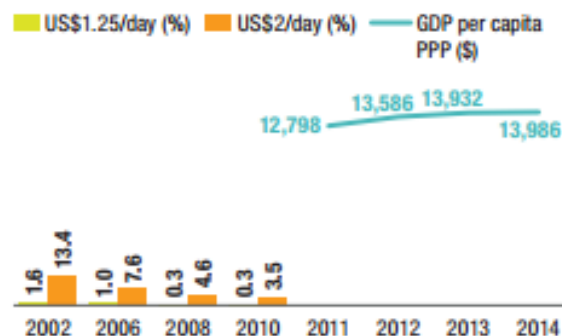
Impact of investing in nutrition



Source: Milken Institute.

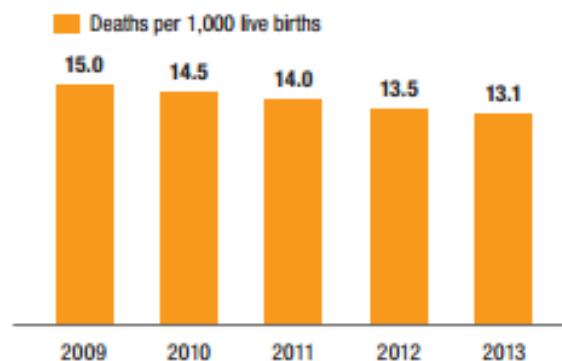
ECONOMICS AND DEMOGRAPHY

POVERTY RATES AND GDP



Source: World Bank 2015.
Note: PPP = purchasing power parity.

UNDER-5 MORTALITY RATE



Source: UN Inter-agency Group for Child Mortality Estimation 2014.

INCOME INEQUALITY

Gini index score*	Gini index rank†	Year
39	75	2010

Source: World Bank 2015.
Notes: *0 = perfect equality, 100 = perfect inequality. †The countries with a Gini index are ranked from most equal (#1) to most unequal (#145).

POPULATION

Population (000)	67,401	2015
Under-5 population (000)	3,507	2015
Urban (%)	36	2015
> 65 years (%)	20	2015

Source: 2015 projections from UNPD 2013.

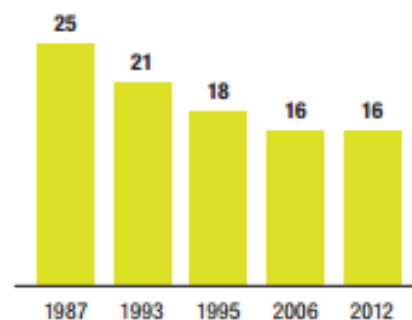
CHILD ANTHROPOMETRY

CHILD ANTHROPOMETRY

Number of children under 5 affected (000)		
Stunting ^a	604	2012
Wasting ^a	248	2012
Overweight ^a	404	2012
Percentage of children under 5 affected		
Wasting ^a	7	2012
Severe wasting ^a	2	2012
Overweight ^a	11	2012
Low birth weight ^b	11	2010

Sources: ^aUNICEF/WHO/WB 2015; ^bUNICEF 2015.

PREVALENCE OF UNDER-5 STUNTING (%)



Source: UNICEF/WHO/WB 2015.

CHANGES IN STUNTING PREVALENCE OVER TIME, BY WEALTH QUINTILE



Source: DHS surveys 1990–2011 adapted from Bredenkamp et al. 2014.

SUBSCRIBER COPY NOT FOR RESALE

OCTOBER 4, 2010

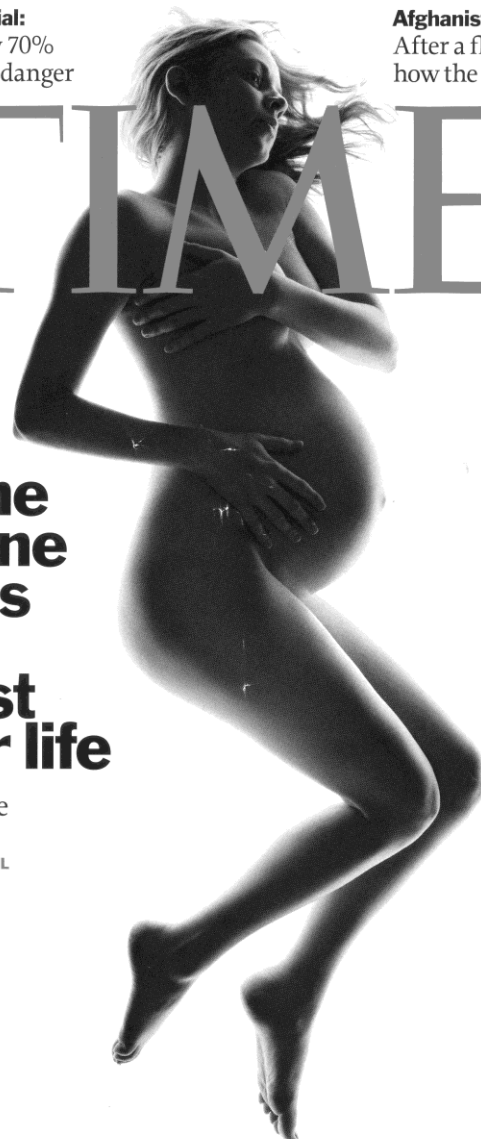
Environment Special:
The oceans—why 70%
of our planet is in danger

Afghanistan:
After a flawed election,
how the world can help

TIME

How the first nine months shape the rest of your life

The new science
of fetal origins
BY ANNIE MURPHY PAUL



USA \$5.99/ISSUE (USPS 0200-1000) CANADA \$7.99/ISSUE (USPS 0200-1000) MEXICO \$4.99/ISSUE (USPS 0200-1000) REST OF WORLD \$10.99/ISSUE (USPS 0200-1000) POSTAGE AND FEES EXTRA. © 2010 TIME INC. ALL RIGHTS RESERVED. PRINTED IN THE USA. POSTMASTER: SEND NO MONEY BACK FOR UNDELIVERED COPIES. POSTAGE WILL BE PAID BY ADDRESSEE. PERMIT NO. 1000 NEW YORK, NY. POSTAL REGULATION MAIL PERMIT NO. 1000 NEW YORK, NY. POSTAGE WILL BE PAID BY ADDRESSEE. PERMIT NO. 1000 NEW YORK, NY. POSTAGE WILL BE PAID BY ADDRESSEE. PERMIT NO. 1000 NEW YORK, NY.





Atoms for THAILAND policy/guideline on all forms of malnutrition

- Global policy –exc. breastfeeding for 6 mo
 - BF studies to guide national policy
- Fd-based guideline eg complementary fds
 - impact on growth/development
- Dietary Reference Intake (DRI)
 - energy requirement; protein/amino acids; micronutrients





Atoms for Early Life Nutrition: Foods for Impact

Thailand Policies: maternal/child nutrition; IYCF → prevention of obesity and NCDs

Stable isotope techniques for:

-Human milk intake; Body composition

-Total Daily Energy expenditure



Evidence: Exclusivity of breastfeeding; mother/infant nutrient intake; impact of local CF eg fortified broken rice; body fat estimation; physical activity levels



Whey protein

(the predominant ...)



Egg



Fish



Milk and milk products



Beef



Chicken



Soy



Legumes

(e.g. beans, lentils)



Atoms for diet quality-micronutrients, protein/amino acids

Thailand Policies: From Farm to Fork value chain; food-based strategies for malnutrition

Stable isotope techniques for:

-Bioavailability; Efficacy of intervention

-Interaction with Obesity/NCDs



Evidence: Fortified rice and condiments, bio-fortified crops, legumes, vegs/fruits –increased absorption

and improved status





Technical support/capacity development: Built to Last- Institute of Nutrition, Mahidol University, Thailand

- Technical Cooperation at regional /national levels: priority agenda, networking
- Human resource development: Expert Mission; Scientific visits; Workshops and trainings; doctoral CRP
- Instrumentation and Facilities: Regional or Sub-regional RESOURCE Centers





Issues to Consider

- **The best of science/evidence drives policy**
Key: address policy needs; advocacy – art of communication; transfer knowledge to practice
- **Support from Office of Atoms for Peace-Thailand**
Key: platform – tech collaboration & capacity development; multisectoral linkage; continuity
- **Dissemination of knowledge across borders**
Key: resource hub for SE Asia, multi-country cooperation, share and learn

Thank you!

2016 IAEA Scientific Forum
**Nuclear Technology for
the Sustainable Development Goals**

