IRON-FORTIFIED SOY SAUCE IN CHINA
– AN ASSESSMENT OF 10 YEARS OF POLICY AND BUSINESS DEVELOPMENT

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Granada, Spain. September 20, 2013
ID and IDA Are Public Health Problems in China

- **Prevalence of ID** – CBA women 42.6%, pregnant women 19.1%. Prevalence of IDA – CBA women 34.4%, 15.1% pregnant women.

- **The Fourth National Nutrition and Health Survey (2002)** showed the prevalence of anemia of whole population and women were 20.1% and 23.3%.

- **Preliminary analysis of the Fifth National Nutrition and Health Survey (2013)** showed a decreased anemia prevalence in urban population.
  (11th National Nutrition Conference. May 15-17, 2013, Hangzhou)
Iron-fortified soy sauce was identified as one of the key measures in controlling ID and IDA in China

- Sufficient international experiences and iodine salt project experience in China showed that food fortification is an effective and low cost method for prevention of ID and IDA.

- Chinese government, soy sauce industry, academia and public health professionals considered iron fortified soy sauce as a feasible approach for ID and IDA control China.

- Soy sauce is a traditional condiment in China with high population coverage. Consumption of soy sauce is self-limited, averagely 9 ml consumed per person per day; manufacture of soy sauce is relatively centralized compared with other processed foods; soy sauce as a dark and salty liquid causes less problems to fortification technology.
General Planning of IFSS Project

1997-2002: Development of scientific basis and technology for IFSS: research, feasibility, standard, etc.

2003-2009: Phase I: Distribution of manufacture technology, marketing and social marketing, promotion, working model, etc.

2010-2013: Phase II: Explore of sustainable market of IFSS; establish IFSS market chain, etc.

2014-2018: Continuous promotion of IFSS in high risk population of ID and IDA. Integrate IFSS into the framework of nutrition improvement.
Efficacy trial in anemic school children

*Hemoglobin levels in IDA students treated by NaFeEDTA fortified soy sauce*

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Before (g/l)</th>
<th>1 month (g/l)</th>
<th>2 months (g/l)</th>
<th>3 months (g/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>81</td>
<td>116.9±5.5</td>
<td>117.9±6.3</td>
<td>118.6±5.3</td>
<td>118.5±4.7</td>
</tr>
<tr>
<td>5 mg Fe</td>
<td>82</td>
<td>115.4±5.1</td>
<td>117.2±8.5</td>
<td>128.4±7.0(^a)</td>
<td>135.7±8.5(^a)</td>
</tr>
<tr>
<td>20 mg Fe</td>
<td>77</td>
<td>116.1±5.1</td>
<td>124.0±10.6(^a)</td>
<td>131.6±11.6(^a)</td>
<td>140.0±9.5(^a)</td>
</tr>
</tbody>
</table>

\(^a\), compared with the control group, p<0.01

No difference in Hb levels between 2 intervened groups at the end. Iron status (serum ferritin and protoporphyrin) significantly improved in both intervened groups

Effectiveness trial in rural population - village location

(14,000 residents > 3 yr. old, randomized controlled trial, 15 ml soy sauce per person/day, 29.6 mg Fe/100 ml added in form of NaFeEDTA, free delivery)

Y: active group
G: control group

(Food and nutrition bulletin, 2005, 26(2):177-186)
Changes in anemia prevalence (%) after intervention (male)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Active Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>baseline</td>
<td>percentage</td>
<td>percentage</td>
</tr>
<tr>
<td>6 month</td>
<td>percentage</td>
<td>percentage</td>
</tr>
<tr>
<td>1 year</td>
<td>percentage</td>
<td>percentage</td>
</tr>
<tr>
<td>1.5 year</td>
<td>percentage</td>
<td>percentage</td>
</tr>
</tbody>
</table>

- 3-6yrs.
- 7-18yrs.
- 19-54yrs.
- >55yrs.
Changes in height and weight in 3-6 year old children one year after intervention

* Compare with control group, p < 0.05
The study township (Haizijie) has a population of 61,865 and a per capita GNP of 1,619 CNY in 2002. If the anemia prevalence could reduce by 30%, the improved productivity will significantly increase the township economy, i.e. 8.76 million CNY (1.05 million USD) for adults and 26.9 million CYN (3.2 million USD) for children in the next 10 years. (according to Ross and Chen, 2003)
GAIN Project - Use Iron Fortified Soy Sauce in ID and IDA Control and Prevention in China — Supported by Government and GAIN

- **Signature ceremony** — October 17, 2003, Great Hall of the People's, Beijing
- **Grant:** 3 million USD, 2003-2008
- **Executive agency** — FFO, China CDC
Working model for the project: two wheels turn simultaneously

<table>
<thead>
<tr>
<th>Policy Regulation Standard</th>
<th>Partner</th>
<th>Collaborator</th>
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</thead>
<tbody>
<tr>
<td>Leadership Organizing Coordination</td>
<td>China Condiment Industrial Association</td>
<td>Government: The Ministry of Health</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Implementation Bodies</th>
<th>Partner</th>
<th>Collaborator</th>
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</thead>
<tbody>
<tr>
<td>The Health Inspection Agencies</td>
<td>The Participated Soy Sauce Producers</td>
<td>CCDC FFO</td>
</tr>
<tr>
<td>Local CDC</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Task</th>
<th>Partner</th>
<th>Collaborator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Control</td>
<td>Social Marketing</td>
<td>Monitoring</td>
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<tr>
<th>Goal</th>
<th>Partner</th>
<th>Collaborator</th>
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</thead>
<tbody>
<tr>
<td>Product</td>
<td>Population</td>
<td>Nutrition Improvement</td>
</tr>
<tr>
<td>Advocacy and Communication</td>
<td>Mass Media</td>
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Recruiting process for soy sauce producers

1. Applicants submit application to the project office (FFO)
2. Review by Chinese Condiment Association
3. Site visit on the capability of the applicant by FFO experts
4. Training on technology, HACCP and analytical methods for NaFeEDTA in soy sauce
5. Producers establish HACCP system and operate for 3 months
6. Final site visit by experts and licensing of logo
Advocacy Activities, Communication and Social Marketing

Launching meetings
News, Cooking, Health and Science Programs in Both Central and Local TV
Booklets, Brochures, fly sheets and pamphlets
Posters
Wall boards and Scrolls
Wall calendars and desk calendars
Training courses to local work staff, manufacture staff, distributor staff and mass media staff
Cooperate with supermarket

CASE: Collaborated with Carrefour (China) again to held “Balance of Nutrition, Health of Family”, a food fortification advocacy week. 163 stores in 45 cities of Carrefour
Anemia rate in women after intervention

FFO survey data, 2008
Awareness rate of at-risk population

FFO survey data, 2008
Iron Fortified Soy Sauce Product

110 products produced by 23 producers.

Based on grades of soy sauce:
- Special grade – 7 products;
- Grade 1 – 23 products;
- Grade 2 – 14 products;
- Grade 3 – 66 products.

Based on types of packaging:
- Bottle – 56 products;
- Soft bag – 27 products;
- Barrel – 27 products.
IFSS Sales Increased in Sales

FFO survey data, 2008
Emphasis in IFSS Phase II

FFO and CCIA work together

Phase I
- IFSS production
- Distribution
- Awareness of IFSS

Phase II
- IFSS production
- Distribution
- Consumption
Scaling Up IFSS Sale

CCIA organized condiment distributors to scale up the market of IFSS in China
The use of IFSS in Boarding Schools

- Goal: IFSS covers all boarding schools in rural area in one county of all provinces.
- 1.4 million USD, funded by MoH
- Previous case study: IFSS was used in all 29 boarding schools in Huairou county and Yanqing county in Beijing.
Soy Sauce: 5 Millions MT/yr

Restaurant consumption 40%, 2 million MT

Food processing consumption 30%, 1.5 millions MT

family consumption 30%, 1.5 millions MT

Current IFSS Market

Restaurant consumption 40%, 2 million MT

Food processing consumption 30%, 1.5 millions MT

family consumption 30%, 1.5 millions MT

Government support plays key role
Discussions

- Mandatory fortification is the successful international experience, but in China there need a new way. The government orientated partnership model for IFSS promotion shows sustainability.

- Food safety has became a social stable factor. Food fortification is therefore becoming a sensitive issue rather than nutrition improvement.

- Mass fortification is difficult to bring profit for food companies, but increases the image of producers and enriches their product types.

- Demanding on health and nutrition by consumers requirements still the force to drive IFFS market. So far, the social image of IFFS in China is very good.
Feel confident!
But a long way to go!

Junshi Chen
The leader of IFSS project