Current state of food security: Research, Education and Outreach in Burkina Universities

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Global Challenges University Alliance
Food Security, Quality and Safety

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Current state of food security: Research, Education and Outreach in Burkina Universities

- Short presentation of Burkina Faso
- Polytechnical University of Bobo-Dioulasso
- University of Ouagadougou
- Research activities
- Challenges

Swedish Agricultural University, Uppsala, 22-24th May, 2013
Map of Burkina Faso

Area: 274 000 km²
I. Introduction

• Burkina Faso is a Sahelian West African country
• Climate: tropical dry and hot
• Long dry season (8 months) and high mean temperatures (maximum 45 degrees C).
• Population is 16 million and 43.9 % lives below the poverty line
• Burkina Faso is classified as both a least developed country and a low-income, food-deficit country.
Economy

• The economy of BF is largely dependent on the primary sector, which contributes to one third of GDP.
• Livestock contributes to 20% of GDP and is fundamental to household food security, but this sector receives low investments.
II. Food security and Nutrition status of Burkina Faso

- **Undernourished general population**: 50%
- **Food availability**: 1870 Kcal/day
- **Obese people**: 7.3%
- **Children underweight**: 29%
- **Children wasted**: 13%
- **Children stunted**: 30%
- **BMI general population**: < 18.5 kg/m²

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Comparison of Global diets:

(1 billion is undeweight and 1 billion overweight!!!)

<table>
<thead>
<tr>
<th>Country</th>
<th>kcal per person.day</th>
<th>need</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>3000</td>
<td></td>
</tr>
<tr>
<td>USA</td>
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<td></td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>3000</td>
<td></td>
</tr>
</tbody>
</table>

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Staple foods: cereals, milk and meat

Imported food concerns mainly cereals and milk.

- Cereals (mainly rice and wheat) about 200,000 tonnes per year
- Milk and eggs about 10,000 tonnes per year
III. Political Actions to ensure Food security and Nutrition
Increase agricultural production to be self/sufficient

BF is one of the country that respects the 2003 Maputo’s declaration’s call to invest at least 10 percent of the budget in agriculture, in order to increase agricultural production and attain food self-sufficiency. Currently more than 15% of national budget is spent for Agriculture and Food Security.
Strategic plan

Since January 2013, we have a new Ministry of Agriculture and Food Security

- Project of building small dams to support irrigation was introduced

- Production of improved seed has been reinforced and a national seed center was created to produce improved seed.

- Government is also supplying producers with free seed (cost: 13 million USD per year) as well as heavily subsidised fertiliser, tractors and pumps (cost: 30 million USD per year) for irrigation.
IV. UNIVERSITY ACTIONS FOR FOOD SECURITY AND NUTRITION
Universities in Burkina

7 Public universities

3 Private universities (UCAO, USTA, ULB)
The polytechnic university of Bobo Dioulasso

- Created en 1995 by the transfert in Bobo Dioulasso of 2 institutes et 1 school of UO

- Localisation : 15 km from the city (1000 ha). Laboratories and one institute are localised in town
  - 5 Institutes , 1 school
- total number of student : 3 000

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Institutes and school of the PUB

1. Institute of rural development
2. School of computer science
3. Institute of technologies
4. Institute of exact and applied sciences (ISEA)
5. Institute of natural and life sciences (ISNV)
6. Institute of health sciences (INSSA)
The institute of rural development
6 departments

- Agronomy
- Animal husbandry
- Water and forest sciences
- Sociology and rural economy
- Agricultural extension service
VI. VISION OF THE PUB ON FOOD SECURITY THROUGH EDUCATION / TRAINING & RESEARCH
Education and training on food production

- Animal production (ruminant, pigs, poultry)
- Crops production
- Aquaculture and forest production
Education and training on food processing

- Post/harvest technologies
- Technologies of meat and fish
- Technology of milk and milk products
- Technologies of fruits and vegetables
- Value Chain Approach in the curricula of the department of agricultural extension education
Research on food security in the institute of rural development

Research on food security concerns

• Improvement of animal health and production in the rural areas to increase production and intake of animal food protein by the population (meat and eggs)

• Evaluation of locally available by-products in animal nutrition to reduce cereal intake by animal

• Research on new varieties of cereal seed suitable for arid environment

• Research on soil fertility for a sustainable agriculture production

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University of Ouagadougou

www.univ-ouaga bf
University of Ouagadougou (I+II)
www.univ-ouaga.bf

Public University
Physics_Chem, Maths: 3500 students
Life and Earth Sciences: 5800 students
Medecine and Pharmacy
Art and Communication
Human and social sciences
Economy and accounting
Law and political sciences

Faculties (7)
(53 000 students, 72% of students from Burkina Faso)

Lecturer staff: 450 prs
Administration: 500 prs
Faculty of life and earth sciences

DEPARTEMENT OF BIOCHEMISTRY AND MICROBIOLOGY

After 2 years of Biological chemistry

Bsc Natural substances

Bsc Biochemistry and Microbiology

Bsc Food Technology and Human Nutrition

Msc, PhD, BIOTECHNOLOGY

Msc, PhD Agrotech and Food Science

Msc, PhD Human Nutrition

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Curricula of Food Technology and Human Nutrition

FONDAMENTAL (45 credits)
- Structural Biochemistry
- Enzymology and Metabolism
- Immuno-chemistry
- Bioenergetic
- Analytical sciences
- Computer Science

APPLIED (75 credits)
- Epidemiology
- Physiology of nutrition
- Food composition Tables
- Food technology 1
- Food microbiology and hygiene
- Enzymes and nutrition
- Physico-chemistry of food

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Curricula of Food Techno and Nutrition, cont........

**FONDAMENTAL (300 hrs)**
- Molecular Biology
- Biophysics
- Structure of Macromolecules
- Molecular Enzymology
- Computer Science (ITC)

**APPLIED (500 hrs)**
- Community nutrition
- Research technics and methods in nutrition
- Nutrition assessment
- Food technology
- Food microbiology and hygiene
- Quality assessment
- Accounting and management

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Curricula of Master in Agrotechnology and Biochemical Engineering of Food Process

**FONDAMENTAL (45 credits)**
- Applied physical-chemistry
- Analytical Methods
- Molecular Biology (GMO)
- Immunology
- Food Physics
- Biochemistry of Macromolecules
- Food Biochemistry

**APPLIED (75 credits)**
- ITC and Biostatistics
- Enterprise
- Monitoring agricultural and industrial waste products
- Food Toxicology
- Quality managing
- Biosecurity
- Physico-chemistry of food

Swedish Agricultural University, Uppsala, 22-24th May, 2013
Curricula of Master in Agrotechnology and Biochemical Engineering of Food Process cont........

**FONDAMENTAL (350 hrs)**
- Food Technology
- Biophysics
- Structure of Macromolecules
- Molecular Enzymology
- Computer Science (ITC)
- Bioinformatics (gene banks, phylogeny, simulations, etc.)

**APPLIED (550 hrs)**
- Applied Microbiology
- Research technics and methods in Agrotech
- Research Proposal and Literature search
- Food microbiology and hygiene
- Accounting and management

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Student contributions to ensure food security

- Lecturer of Food Technology and Human nutrition at secondary school (started 2003)
- Food industries (beverage, bakeries, milk industries)
- NGOs related to Nutrition & Food science (FAO, UNICEF, GTZ, IRD, etc..)
- Small scale food enterprises
- Public function at ministry of AGRICULTURE and Food Security or Animal breeding
- Creation of private food enterprises
General origin of foreign students

- Benin
- Cameroon
- Centrafrica
- Congo
- Côte d’Ivoire
- Guinée
- Djibouti

- Gabon
- Niger
- Mali
- RDC (Zaire)
- Tchad
- Togo
Research facilities: Laboratories at University and Research centres
RESEARCH ACTIVITIES

- Food consumption of children 6 – 36 months old in rural area in relation to micronutrients rich food availability
- Vitamin A supplementation and weaning food energy intake of infant between 6 and 10 months
- Dietary intake and anaemia prevalence in women of childbearing (17-40 yrs) age
- Novel sources of lipids from wild grains of Burkina
- Biochemical and hygienic qualities assessment of street foods in Burkina Faso
RESEARCH PROJECTS cont........

- Nutritional quality evaluation of sorghum and millet varieties: application in weaning food preparation

- Nutraceuticals (Antioxidant activities) of staple food and medicinal plants of Burkina Faso

- Molecular epidemiology of Aflatoxin and fumonisin contamination of maize in Burkina Faso

- * Tables of Food Composition,
Research and training collaborations in Food, Agrotech and Human Nutritrion

Main collaborators for training and research

- Wageningen University
- Institut National de Recherche pour le Developpement IRD, France
- University of Marseille
- Benin, Côte d´Ivoire, Togo, etc

Others for training

**Africa:** Benin, Niger, Côte d´Ivoire, Togo and Senegal  
**Europe/USA:** Cornell University (USA), Wallone Center of Industrial Biotech (Belgium); Leeds University (England)
International meetings on Nutrition and Food Science

22-24 Novembre 1999: Small scale food industries to ensure food security and Nutrition in West Africa. IFS, WAU, IRD.

23-28 Novembre 2003: Food-based approaches for a healthy nutrition in West Africa: the role of food technologists and nutritionists. WU, IRD, FAO.

8-10 Novembre 2005: Use of GMO and risk analysis in agro-food industries. AUF/CIDEFA/GP3A/UO.

5-8 January 2010: Evaluation and Management of Biotechnological risks with GMO. ANB.

Regional Networks

- 1998. UNESCO chair of Biotechnology
- 2000. Association of African University (AAU) regional center for Biotechnology
- 2004. African Centre of Excellence For Biological, food and Nutritional Sciences by Association Universitaire pour la Francophonie (AUF).
- 2006. UEMOA Centre of Excellence in Biotechnology
- 2011. Partner of International Master degree training in distance in Biotechnology (with UCAD)
- 2012. UEMOA Centre of Excellence in Biotechnology and Molecular Biology
CAADP - Comprehensive African Agricultural Development Program

Pillar 1
Land & water mgt

Pillar 2
Rural infrastructure & trade-related capacities for market access

Pillar 3
Increasing food supply & reducing hunger

Pillar 4
Agricultural research, technology dissemination & adoption

Capacity strengthening cuts across all the Pillars

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CHALLENGES for Food Science and nutrition

A. EDUCATION

Create specific curricula focusing of Food Science

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B. Staff

Increase the number of permanent staff, because enough PhD in Agrotech, food techno and nutrition but no permanent positions. 4 PhD in Nutrition and Food Science are currently available without positions.

Recruit more tutors for practicalities because they are currently carried out by graduate students.

Lack of updating of staff with respect to ITC and research.

Low salary of staff, so no stimulation from the government. Without projects. Plan for academic promotion is clear but difficulties to carry out research because of students supervision and lectures.
C. Research

- Necessity to include incubators at University
- Increase maintenance of equipment
- Increase number of qualified research assistants
- Application of the research, e.g. Food Science, Agrotec, and Nutrition interventions
- Solve ethical problem and reticence of population in food security by sociologic approach
- Find long term projects instead of short term ones
- Focus on pragmatic projects instead of theoretical ones
MERCI BEAUCOUP

"FOFO"