Wild Edible Plants: Promoting Dietary Diversity in Poor Communities of Lebanon

Malek Batal
February 2006
Wild Edible Plants: Promoting Dietary Diversity in Poor Communities of Lebanon

- Supported by IDRC since December 2004 (for 2 years)
- Implemented by the American University of Beirut, Lebanon
  - Department of Nutrition and Food Science
  - Environment and Sustainable Development Unit (ESDU)
  - Initiative for Biodiversity Studies in Arid Regions (IBSAR)
ESDU

- Established in 2001 as an inter-disciplinary research and development unit within the Faculty of Agricultural and Food Sciences (FAFS) at the American University of Beirut
- Specialized in community development and sustainable agriculture
- Mission: to break away from the restrictions imposed by the traditional compartmentalization of research and foster action-centered, policy-relevant and participatory research
The Interfaculty Research Center is a platform for AUB faculty to identify values of biodiversity and promote its sustainable use for the economic well being of societies.

IBSAR a vision

2001: 8 faculty members and 5 young scientists
2006: 24 Faculty members and 93 young researchers trained

IBSAR a successful academic growth

Driven by innovative research IBSAR members are interested not only in generating concepts but in extending multidisciplinary collaborations to link between concepts and practice.

The Center is spearheading technology transfer and promoting University mission to serve the people of the Middle East.

IBSAR a research venture

Biotechnology: Bioprospecting

Guide policy

Engage society: Public/private/NGO

Valuate biodiversity and Explore and develop economic opportunities
Looking for answers to problems in:

- Nutrition and health
- Ecosystem management
- Economic development
- Gender equity
Nutritional Status in Lebanon

- Iron Deficiency Anemia (33% of women of child bearing age – Hwalla, *unpublished*)
- 14% of children are stunted (Melzer, 2002)
- Obesity rates reaching figures in developed countries, including for children (Sibai et al., 2003)
- 42.1% of boys and 40.7% of girls under 10 are overweight (Sibai et al., 2003)
- Hypertension (23% in a sample of men and women in Beirut – Tohme, 2005)
- Other chronic diseases (CVD, diabetes) on the rise (Salti et al., 2000)
Food consumption patterns in Lebanon

- Low consumption of fruits and vegetables (Hwalla, 2004)
- High consumption of bread and refined grains (~350g/d) (WHO, 1998).
- Low consumption of fish (Hwalla, 2004)
- Low dietary diversity (Shaker, unpublished)
- Decreased consumption of traditional foods due to urbanization (Mouawad, 2004)
- Indicators of food insecurity (IFPRI, 2003, report on WFS 2004)
The Potential of the Lebanese Traditional Diet

- Legumes
- Wild edible plants
- Fruits
- Vegetables
- Whole cereal products
- … etc.

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Perceived Health Benefits of Wild Edible Plants

Jeambey et al., 2005

- Digestive Tract
- Diabetes
- Blood System (anti-anemic, purifier)
- Hepato-protective
- Anti-poison
- Anti-cancer
- Urinary Tract

- Nervous System
- Inflammation
- Cardiovascular System
- Respiratory Tract
- Edema
- Acne
- Bruises
- Disinfectant
- Mouth Freshener
- Nutritious

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The Ecosystem

- Conventional agriculture suffering from:
  - Low profit margins
  - Insufficient local markets
  - Cheap imports from neighboring countries
- Underutilized and neglected plant species
- Threatened ecosystem (managed and wild)
- Urbanization
Economic Status and Gender Equity

- Great disparity within society
- Rural areas harder hit by economic hardship
- Migration to urban centers and swelling of “poverty belts”
- Economic activity dominated by males while females hold the knowledge about wild edible plants
Wild Edible Plants: Promoting Dietary Diversity in Poor Communities of Lebanon

Aim:

Increasing dietary diversity in the urban and rural poor through the promotion of the sustainable use of wild edible plants, ultimately improving general health status in the targeted communities.
Wild Edible Plants: Promoting Dietary Diversity in Poor Communities of Lebanon

- Goals:
  - Promote improved health & dietary diversification
  - Increase reliance on wild plants and local food systems
  - Decrease micronutrient deficiencies and health problems due to high reliance on refined foods
Wild Edible Plants: Promoting Dietary Diversity in Poor Communities of Lebanon

General Objectives

- Development of an understanding about wild edible plants
  - Identification and collection of plants
  - Use of plants – ex: collection of recipes
- Assessment of nutrition and health status of the surveyed communities
- Promotion of wild edible plant use in the diet at local and national level
  - Promote benefits of wild edible plant recipes
  - Promote proper management of the ecosystem
- Capacity development and the setup of a scientific network
Program Components

- Research
- Community Development
- Dissemination
  Communication & Publication
- Regional Partnership
Research axis #1:

Use, consumption and health and medicinal properties of six species of wild edible plants in the northeast of Lebanon (Jeambey, McGill University, 2005)

Assessing the current use and significance of wild edible plants traditionally gathered in Lebanon: an ethnobotanical study (Marouf, AUB, 2005)

Indigenous nutritional knowledge, cultural importance and nutritional analysis of wild edible plants (Farhat, AUB, 2006)

The potential of biodiversity-based traditional Lebanese recipes in improving dietary diversity and food security
Aim of Study

- Investigate the potential of wild plant based traditional Lebanese recipes for increasing diversity of nutrient intake and food security

- Improved dietary diversity
- Improved nutrient intake
- Food security
Target Population

- **Target Areas:**
  - Irsal (Bekaa)
  - Koueikh (Hermel)
  - Shouf
  
  Rural areas still preserving traditional eating habits

- **Target population:**
  - Men and women – key informants knowledgeable in traditional recipes using wild edible plants
Methodology

1. Focus group meetings with key informants
2. Information about use, collection, and potential benefits of wild edible plants.
3. Standardization of collected recipes
4. Chemical analysis for wild plants
5. Nutrient analysis of recipes
6. Documentation in DATABASE
I don't have a nicer picture! - but can look for some at Yara's

Linda, 8/16/2005
Results: Demographic Information

- Number of focus group meetings: 6
- Number of individuals participating in focus group meetings: 21
- Average age: ~ 58 years
- Key informants consisted of senior community members knowledgeable in wild edible plants and cooking methods
- Information about recipes and cooking came mostly from women
- Information about benefits and collection of plants came from both men and women
- The majority of members participating in the focus group meetings grew plants or were farmers.
L3  I estimated that we did 2 in each community
   Linda, 8/16/2005

L4  I am not sure about this figure - need to double check - but just for now let's keep it.
   Linda, 8/16/2005
Results – Recipes Collected

- Ten most common recipes were collected and analyzed for nutrient content and potential health benefit
# Example of Recipes: The Database

<table>
<thead>
<tr>
<th>Recipe name</th>
<th>English Name</th>
<th>Scientific name of plant in recipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatayer zaatar akhdar</td>
<td>Bible hyssop; marjoram</td>
<td><em>Origanum syriacum</em></td>
</tr>
<tr>
<td>Khubbayzeh and labneh</td>
<td>Mallow</td>
<td><em>Malva sylvestris</em></td>
</tr>
<tr>
<td>Kishk and mint</td>
<td>Wild mint, Horsemint, Silver mint</td>
<td><em>Mentha longifolia</em></td>
</tr>
<tr>
<td>Farfahin and yoghurt</td>
<td>Green Purslane</td>
<td><em>Portulaca oleracea</em></td>
</tr>
<tr>
<td>Chickpeas and Mishe</td>
<td>Salsify</td>
<td><em>Tragopogon buphtalmoides</em></td>
</tr>
<tr>
<td>Korsanneh and tehineh</td>
<td>Eryngo</td>
<td><em>Eryngium creticum</em></td>
</tr>
</tbody>
</table>
# Results – Nutrient Value of Recipes
## A comparison

<table>
<thead>
<tr>
<th></th>
<th>Side dish Farfahine (Purslane) &amp; Yogurt (serving size: 300g)</th>
<th>Fast food Coleslaw Salad (300 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (Kcal)</td>
<td>162</td>
<td>444</td>
</tr>
<tr>
<td>Carbs (g)</td>
<td>14</td>
<td>39</td>
</tr>
<tr>
<td>Proteins (g)</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Fats (g)</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>Vit C (mg)</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Retinol (mcg)</td>
<td>68</td>
<td>66</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>1.2</td>
<td>2</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>338</td>
<td>102</td>
</tr>
</tbody>
</table>

Research #1
Farfahine (Purslane) and Yogurt:
A healthy alternative

- A healthy side dish or snack
- Low calorie
- Good source of calcium
- Good source of protein (complete protein)
- Good source of fiber
- Easy to prepare – accessible
Farfahine (Purslane) and Yogurt:
A healthy alternative

Some plant properties:
- Muscle relaxant activity
- Antiscorbutic activity
- Diuretic effect
- High in Omega-3 fats
- Active compounds:
  - Polyunsaturated essential fatty acids,
    antioxidant vitamins
    and oxalic acid
Contribution to Dietary Diversity and Food Security
Results from community informants and general analysis of results

- Contribution to dietary diversity and dietary quality
  - Rich in essential nutrients
  - Diversity in groups of foods within meals
  - Considered as healthy meals (constituting main meals or snacks)
  - Plants used have a number of therapeutic and beneficial properties
  - Natural and devoid of food preservatives and additives
Contribution to Dietary Diversity and Food Security
Results from community informants and general analysis of results

- Contribution to health
  - Heart disease (cholesterol, saturated fats, antioxidants, etc.)
  - Cancer (flavonoids, antioxidants, fiber)
  - Obesity (food variety, lower energy density, …)
  - Child growth (food variety, nutrient content…)
  - Reproductive health (iron, calcium, …)
Contribution to Dietary Diversity and Food Security
Results from community informants and general analysis of results

- Contribution to food security
  - Easy to prepare
  - Cheap ingredients → accessible
  - Familiar to communities – (low and high educational status)
  - Palatable (attractive/exotic)
  - Can be preserved as pickles or dried to provide nutrients throughout the year → consumed during periods of cold and food scarcity

- Other Characteristics:
  - Collection of plants during season creates social bonds between members of the community
Conclusion

- Importance of promoting use and consumption of traditional indigenous recipes including plants in rural and urban communities
- Challenges:
  - Transmission of knowledge regarding these plants risks being endangered
  - Community members above the age of 50 represent the major key informants
  - In some communities, use and consumption of these plants suggests poverty (stigmatization)
Research axis #2

Nutrition and Health Status of Poor Communities Consuming Traditional Foods and Wild Edible Plants
Nutrition and Health Status of Poor Communities Consuming Traditional Foods and Wild Edible Plants

- Objectives
  - Assess prevalence of chronic diseases
  - Assess state of food security (FS) and investigate association between FS and dietary diversity (DD) (Hunter, Laval, 2006)
  - Assess dietary habits and nutritional status
  - Investigate association between chronic disease and DD, WEP, FS…
Questions to be answered ...

Diet
Quality
Diversity

Prevalence of chronic diseases
Blood profile
Anthropometry

Food security
Research #2: Methods

- **Target Areas:**
  - Irsal (Bekaa)
  - Koueikh (Hermel)
  - Shouf
  - Beirut

  Rural areas still preserving traditional eating habits + urban area

- **Target population:**
  - Sample of 1000 men and women aged 40 to 60 years residents of selected areas
Methodology

- Survey - Questionnaire
  - Chronic diseases
  - Lifestyle habits
  - Socioeconomic profile
  - Food security
  - Dietary habits (food frequency, repeated 24-hr recall)
  - Blood Profile
  - Anthropometry
Preliminary data …
Distribution of the population by gender

Male: 51%
Female: 49%
Collection of Wild Edible Plants

Percentage

Yes: 64.9 (blue) + 71.1 (pink) = 136.0
No: 28.9 (pink) + 35.1 (blue) = 64.0

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Total cholesterol profile

- Desirable (<200 mg/dl) for Male: 75.0, Female: 71.6
- Borderline high (201-239 mg/dl) for Male: 17.9, Female: 19.8
- High (>240 mg/dl) for Male: 7.1, Female: 8.6

Male (179.46 SD= 40.40) Female (184.02 SD= 37.19)
Triglyceride profile

<table>
<thead>
<tr>
<th>Level</th>
<th>Male Average</th>
<th>SD</th>
<th>Female Average</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (&lt;150 mg/dl)</td>
<td>205.92</td>
<td>111.54</td>
<td>203.83</td>
<td>101.63</td>
</tr>
<tr>
<td>Borderline high (151-199 mg/dl)</td>
<td>23.1</td>
<td>24.6</td>
<td>32.5</td>
<td>24.6</td>
</tr>
<tr>
<td>High (200-499 mg/dl)</td>
<td>40.2</td>
<td>34.2</td>
<td>38.2</td>
<td>32.5</td>
</tr>
<tr>
<td>Very high (&gt;500 mg/dl)</td>
<td>4.1</td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Fasting Blood Glucose profile

- Normal (< 110 mg/dl) for Male: 79.8, Female: 78.2
- Impaired (111-125 mg/dl): Male: 9.6, Female: 8.0
- Diabetes (>126 mg/dl) for Male: 10.6, Female: 13.8

Male (99.35 SD=34.18) Female (101.77 SD=46.1)
Body Mass Index

- Underweight (<18.5)
- Normal weight (18.50-24.99)
- Overweight (25.00-29.99)
- Obese (30.00-34.99)
- Very obese (35.00-39.99)
- Morbidly obese (>40)

BMI (Kg/m²)

- Male (26.50 SD= 4.16)
- Female (28.05 SD= 5.74)
Expected results

- Consumption of wild edible plants $\rightarrow$ Dietary diversity
- Dietary diversity $\rightarrow$ Dietary quality
- Dietary diversity $\rightarrow$ Improved blood profile and anthropometry (protection from chronic diseases)
Program of promotion of wild edible plant use in the diet at local and national level

- General meetings in all concerned communities for discussion about project
- Cooking festivals to promote WEP
- Media coverage
- Outreach to urban community
- Setup of community kitchens
Media Coverage
Capacity Development
Capacity Development

- Healthy Kitchen
- Community kitchens
- Trainings and partnerships (Food Heritage Foundation)
Capacity Building

- Training of women – Food Production and Hygiene
- Training of women and youth in proper wild edible plant collection techniques
- Training of youth – (Local Links Healthy Kitchen Partnership)
  - Communication
  - Food hygiene
  - Marketing etc.
Propagation

Korra: *Apium nodiflorum*
Communication and Publication

- Participation in regional and international conferences on biodiversity and health
- Cookbooks (Food Heritage Foundation, Local Links)
- PhD thesis
- Masters theses
Regional

- Report on agricultural policies and policy brief
- “Biodiversity as Food” workshop
  - IPGRI (Sub-Saharan African experience)
  - Syrian Ministry of Agriculture
  - University of Jordan in Amman
  - Global Facilitation Unit for underutilized species

- Scientific Network
- Regional database on WEP
- Phase II with regional emphasis

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Future Plans....

- Sustain promotion of consumption of traditional foods and wild edible plants through:
  - Community involvement and development
  - Research
  - Concentrated efforts – regional and international
  - Communication
- Partnership with urban agriculture project and Ecosystem Approach to Health Initiative
- Communication with policy makers and effort at policy change
Answer to Food Insecurity and Malnutrition

Wild Edible Plants

Dietary Diversity

Healthy Accessible Diet

Urban Agriculture

Traditional Diet

Economic Development