



མོ་ནམ་དང་ནགས་ཚལ་ལྷན་ཁག།
ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture and Forests
Tashichhodzong
Thimphu:Bhutan



Edible Wild Plants of Bhutan and their Contribution to Food and Nutrition Security

Kinlay Tshering

Chief Horticulture Officer

Horticulture Division, Department of Agriculture

Ministry of Agriculture & Forests, Royal Government of Bhutan



Presentation Outline

Background

Objectives

Methodology

Results & Discussion

Conclusion



Background



- Topography: Small, landlocked & mountainous country.
- Elevation: 100 m asl–7500 masl
- Landform: Southern Foothills, Inner & Higher Himalayas
- Population: 672, 425 (69.1% in rural and 30.9% in urban)
- Agriculture as the dominant employment & livelihood source.
- Major goal of Agriculture Ministry: “Poverty Alleviation through R&D in agriculture & through sustainable utilization & management of natural resources”





Background



- Wide range of edible wild plants (EWP) exists & our people used to collect and consume it.
- Wild collection & consumption contributed greatly to the food & nutritional well-being of rural people
 - Provided essential nutrients for body growth & development, & for prevention of diseases associated with nutritional deficiencies.
- Traditionally, rural farmers made efforts to preserve these plants around their homes, fields & communal lands.
- Some EWPs consumed as delicacies & they played an important role in Bhutanese diet.
- Over the past decade, government's drive towards commercialization & use of high yielding varieties started eroding the traditional utilization of EWP.



Background



- The diversity, availability, usage & traditional knowledge of EWP are declining because of cultivation of introduced crops, habitat change, rapid dietary changes, etc.
- Growing ignorance among young people about the existence of these nutritionally rich food plants.
- Further exacerbated by lack of major research & extension efforts to improve their husbandry & promote EWP species.
- Under-nutrition and malnutrition are widely prevalent in Bhutan & more acute in rural areas
- Such decline in the use of EWP by rural people could attribute to increased incidence of nutritional deficiency disorders & diseases.



Background



- Concern that the importation & increased cultivation of improved vegetables may reduce the collection & dietary use of EWP and more critically may replace EWP species.
- Feared that reduction in consumption of EWP would result in nutrition related disorders in the rural areas & decrease in sustainable forest usage, consequently, disruption of the coexistence of people & forest & loss of TK in near future.
- The information generated will be used as a reference material for research & development, and thus contributes to the sustainable development & conservation of natural resources in Bhutan.



Objectives



- To investigate the diversity of edible wild plants of Bhutan and their significant and future potentials.
- To find out the availability, distribution and usage of EWPs & also to take stock of the indigenous knowledge about the effect of EWPs on human health.
- To find out the most common edible wild plants and their utilization purposes.



Methodology



- The study consisted of several farm, research centres & market survey through interview with salesmen/women, researchers & residents followed by species identification.
- The 1st survey in April 2005 followed by an annual survey in different parts of Bhutan until May 2009; 18 out of 20 Dzongkhags in Bhutan were covered.
- Investigations took place five times & each investigation took about 2 weeks study in the field.
- Survey carried out by Bhutanese researchers from the MoAF & Japanese researchers from Shinshu University.



Methodology



Survey	Investigation Area
1 st - April, 2005	Western & West-central Dzongkhags (Thimphu, Punakha, Tsirang & Haa) – Market & Farm
2 nd - April, 2006	Eastern & East-central Dzongkhags (Trongsa, Bumthang, Zhemgang, Mongar & Trashigang) – Market, Farm, Research & Forest
3 rd - July, 2007	Western & West-central Dzongkhags (Haa, Thimphu, Punakha & Wangdue) – Market, Farm, Forest & Research
4 th - October, 2008	Western & West-central Dzongkhags (Chukha, Dagana, Gasa & Punakha) – Market & Farm – Market, Farm & Research
5 th - May, 2009	Western & Eastern Dzongkhags (Lhuntse, Trashiyangtse, S/Jongkhar, Pemagatshel, Paro & Thimphu) – Market & Farm



Methodology



Farm /
Forest /
Research
Survey

Market
Survey

Identification



Farm survey



Market
survey



On-site
identification



For lab
diagnosis





Farm / Forest / Research Centre Survey

- Interviewed farmers / researchers on local name, edible parts, cooking & eating methods, their knowledge about its effect on health, collection source, availability season & approximate price if sold.
- Where ever possible, elderly people were selected for the interview.
- Interview followed by field observation & identification of available specimens
- Samples collected for further identification & collection (Gene-bank of National Biodiversity Centre, Bhutan.



Market Survey

- Listed & characterized all the edible wild plants on sale in the vegetable market.
- Interviewed salesperson on local name, edible parts, how to cook and eat, their knowledge about its effect on health, source from where it is collected / brought, season when it is available for collection / sale & the approximate av. price in the market.
- Collected plant samples for further identification and collection (Gene bank of National Biodiversity Centre, Bhutan)



Result and Discussion



- In April 2005, a total of 98 edible wild plants, including 30 wild & 68 domesticated.
 - Wild plant species (21 families) & domesticated plant species (28 families), together belonged to 40 families.
- *Pogostemon amaranthoides* (Namna), *Phytolacca acinosa* Roxb. (Tashi gangkha), *Thlaspi arvense* (Gekha) & *Elatostema lineolatum* Wight (Damroo) - leaf vegetables, were frequently observed
- Young stem of 8 kinds of ferns frequently sold & consumed as vegetable.
 - *Microlepsia* species; *Pteridium revolutum* (BL.) Nakai; *Diplazium esculentum* (Retz.) Swartz; *Diplazium maximum* (Don) C. Christens & four species of *Diplazium*.



Result and Discussion



- In April 2006, a total of 47 edible wild plants belonging to 25 families of *Magnoliophyta* & 12 edible wild plants belonging to *Pteridophyta*.
- Common edible wild vegetables were:
 - *Justicia adhatoda* L. (Bashikha), *Plectocomia himalayana* Griff (Patsha), *Asparagus racemosus* Willd (Ngakhagchu), *Phytolacca acinosa* Roxb. (Tashi gangkha), *Houttuynia cordata* Thunb. (Gaycho), *Chenopodium album* L.(Henshu), *Mentha spicata* L. (Ushila), *Cymbiduum* species (Olachoto), *Pogostemon amaranthoides* (Namna), *Elatostema lineolatum* Wight (Damroo), *Oenanthe javanica* (Bl.)DC (Zeemtsi), *Colocasia esculenta* (L.) Schotts (Dow), *Thlaspi arvense* L. (Gekha) *Urtica dioica* (Zocha) and *Girardinian palmate* (Zocha).



Result and Discussion



- In July 2007, a total of 26 edible wild plants belonging to 19 families of *Magnoliophyta* and 10 edible wild plants belonging to *Pteridophyta*.
- Common plants were:
 - *Plectocomia himalayana* Griff (Patsha), *Elatostema lineolatum* Wight (Damroo), *Thlaspi arvense* L. (Gekha), *Chenopodium album* L. (Henshu), *Mentha spicata* L. (Ushila), *Cymbiduum* species (Olachoto), *Pogostemon amaranthoides* (Namna) and *Phytolacca acinosa* Roxb. (Tashi gangkha).



Result and Discussion



- In October 2008, a total of 66 edible wild plants belonging to 33 families of *Magnoliophyta* and 13 edible wild plant species belonging to 4 families of *Pteridophyta* were determined.
- Some of the wild edible plants are purported to contain medicinal properties and affect human health functionally.
- However, in the case of *Pteridophyta*, they are purported to be contraindicated for cretin conditions more than positive effect for human health.
- In May 2009, a total of 78 edible wild plants belonging to 45 families of *Magnoliophyta* and 8 edible wild plant species belonging to 3 families of *Pteridophyta*.
- Some of the wild edible plants are purported to contain medicinal properties and affect human health functionally and to be contraindicated for certain conditions.



Result and Discussion



- From the 5 years investigation,
 - 108 edible wild plants belonging to 53 families of *Magnoliophyta*, of which 101 species have been identified
 - 20 edible wild plants belonging to 5 families of *Pteridophyta*, of which 15 species have been identified.
- Most common EWPS widely distributed, collected, traded & consumed are:
 - *Diplazium* sp. (Nakey), *Plectocomia himalayana* Griff (Patsha), *Elatostema lineolatum* Wight (Damroo), *Thlaspi arvense* L. (Gekha), *Justicia adhatoda* L. (Bashikha), *Asparagus racemosus* Willd (Ngakhagchu), *Phytolacca acinosa* Roxb. (Tashi gangkha), *Houttuynia cordata* Thunb. (Gaycho), *Mentha spicata* L. (Ushila), *Cymbiduum* sp. (Olachoto), *Pogostemon amaranthoides* (Namna), *Colocasia esculenta* (L.) Schotts (Dow), *Bambusioideae* sp. (Pakshing), *Dioscorea* sp., *Nasturium officinale* (Sim rayo) & *Girardianan palmate* (Zocha).



Result and Discussion



- From distribution & availability perspective, species under *Pteridophyta* is the most common EWPs.
- It is one of the most readily available & economical plant in the markets especially during Spring/summer to monsoon.
- It is true especially for marginal farmers as ferns can be collected easily from wild without paying any cost / royalty for both home consumption & sale in markets.
- Many families in remote Bhutan consume bracken for a very long time in the year & continue the tradition year after year.
- In some regions, ferns are considered as delicacies & preferred over other vegetables which is associated with traditional food habits.



Result and Discussion



- Various parts of plant (leaves, stem, young stem, flowers, inflorescence, tuber, fruit and seed) consumed for food.
- During spring/summer, Bhutanese eat many kinds of EWP's which shows their important role in Bhutanese diet.
- Many edible wild plants are believed to contain medicinal properties and have positive effect on human health.
 - Leaves of *Nasturium officinalis* improve blood, leaves of *Mentha spicata* L. and inflorescence of *Gerardiana* species reduce blood pressure, leaves of *Urtica* species cure tuberculosis, etc.
- Bhutanese link bitter taste of foods with their medicinal properties; therefore, prefer bitter foods made from plant such as flowers of *Adhatoda vasica* Ness, young stem of *Asparagus racemosus* Willd, inflorescence of *Cymbidium* species & young shoots of *Plectocomia himalayana* Griff.



Result and Discussion



Justicia adhatoda L. (Bashikha)



- Edible parts: Flowers
- How to eat: Flowers are eaten as delicacy, good appetizer, Boil, strain (optional) and cook with meat (optional), chili & cheese. It can be stir-fried as well.



Result and Discussion



Asparagus racemosus Willd (Ngakhagchu)

- Edible parts: Young shoot / spears
- How to eat: A delicacy meal, cut into pieces, boil, strain (optional) and cook with meat (optional), chili & cheese.



Thursday, May 31, 12

Horticulture Division



Result and Discussion



Plectocomia himalayana Griff (*Patsha*)

- Edible Part: Inner pith of young shoot
- How to eat: Take out the outer scales, cut into small pieces, boil it, strain (optional) and then cook as any other vegetables.





Result and Discussion



Colocasia esculenta L. (Dow)

- Edible parts: Rhizome & petal base, shoots also dried for winter consumption
- How to eat: Boil the rhizome, peel the skin and eat as potatoes. Petal based can be stir fried as other vegetables.





Cymbidium species (*Olachhoto*)

- Edible parts: It is an orchid, inflorescence used as delicacy, bitter taste liked by many, commonly domesticated
- How to eat: Cut into pieces, boil, strain (optional) & cook with meat (optional), chili & cheese. It can be stir-fried as well.





Result and Discussion



Bambusioideae sp. (Pakshing, Bamboo shoots)

- Edible parts: Young tender shoot preserved, canned or pickled.
- How to eat: Boil with ash, strain, then pickled it or fry as vegetables with chili, onion, meat (optional), etc.





Result and Discussion



Elatostema lineolatum Wight (Damroo)

- Edible parts: Young shoot & leaves as delicacy vegetable
- How to eat: Appetizer, goes very well with *Plectocomia himalaya* Griff; a specialty dish during religious ceremonies, cut into pieces and cook with chili, onion, cheese, meat (optional)

