TECHNOLOGY FOR POULTRY PRODUCTION IN BHUTAN

By

Mr. Dawa L. Sherpa
Research Assistant 1
Renewable Natural Resources Research Centre Bajo, Wangdue Phodrang
Tel. No. +975-02-481209 (0)
E-mail address: dals@druknet.bt

I. PRE-PRODUCTION STAGE

A. Growing Conditions

Criteria	Description
1. Altitude	• Altitude affects the performances of poultry. The effective temperature is affected by altitude as the temperature of air decreases with altitude. • Survives at an altitude of 150-3,400 metres above sea level (masl).
2. Temperature	• When considering the effect of temperature on poultry, take into account not only the average annual temperature but also the modifying affects of air humidity and wind speed. • Performs well at 0^{o}-45^{o}C. Higher or lower temperature affects the performance of poultry.
3. Slope	• Slope has no affect on the performance of poultry birds.

B. Choice of Breeds

- The poultry breeds in Bhutan include the local and improved breeds like the Brown egger. Both breeds are adaptable under local rearing and feeding conditions and the eggs produced are acceptable in the local markets.
- Select breed based on preference.

Main Characteristics of Poultry Raised in Bhutan

Improved breeds

- Developed in Pune, India
- Produce 260 eggs per year
- Meat is acceptable in the local markets
- Can be raised in 5 months for meat and produces eggs in 5 months



Improved breeds
(Photo courtesy of RNR RC Bajo)

Local breeds

- Developed by and available with farmers
- Produce about 80 eggs per year
- Meat is acceptable in the local markets
- Can be raised in 6 months for meat and produces eggs in 6 months
- Good for free range and scavenging condition
- Intelligent enough to drift away from preying birds
- Meat is tasty



Local breeds
(Photo courtesy of RNR RC Bajo)

II. PRODUCTION STAGE

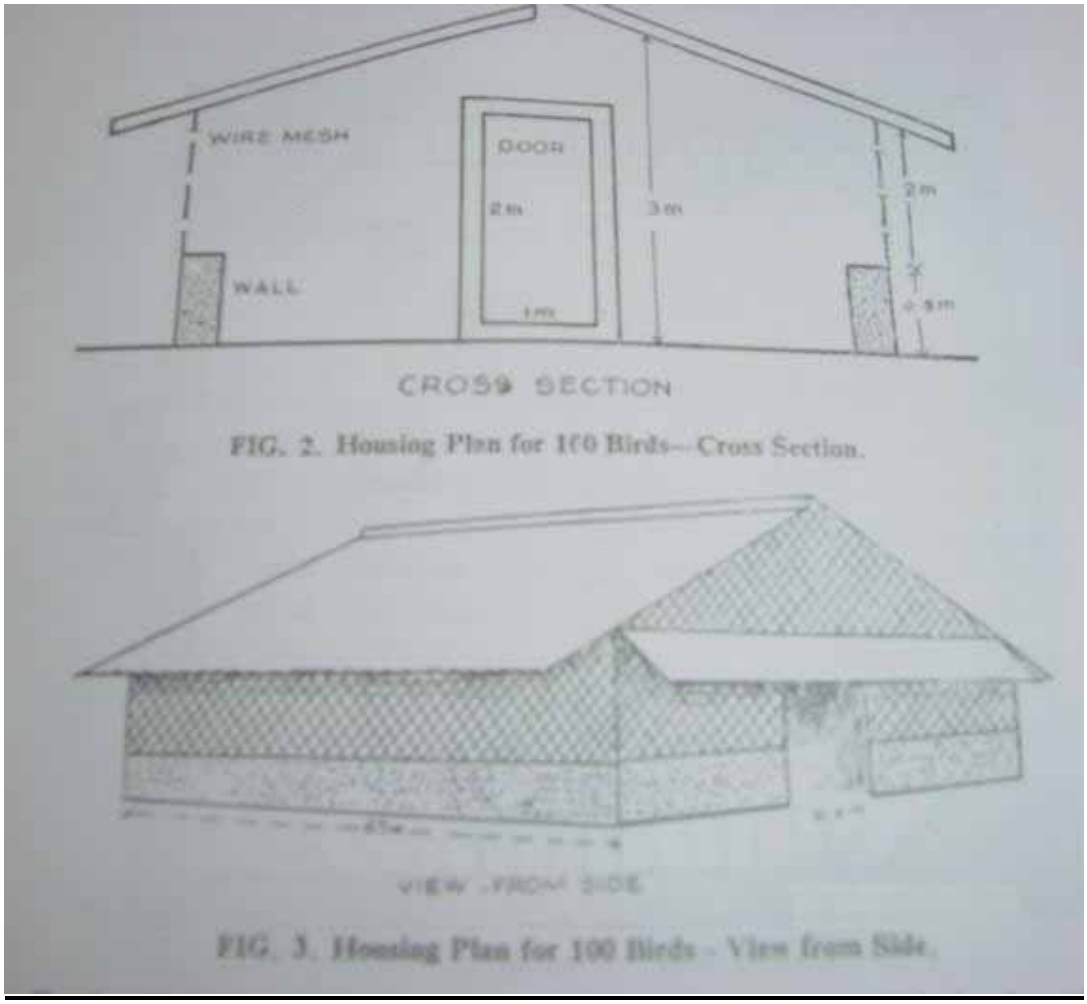
1. Housing for poultry

- Design proper housing with provision for laying boxes, feed and water trough, and an exercise yards (with wire mesh on all sides and on the top).
- Construct poultry sheds only on the east-west axis, that is, the length facing the north and south and the width towards the east and west. Raise the walls on the eastern and western side up to the ceiling level by 3 m.
- Provide 0.18 m^2 of floor space for each layer and 0.09 m^2 of floor space for broiler. The size of the shed depends upon the number of birds to be reared.
- Use any convenient size for the length of the house depending upon the number of birds to be kept and land terrain with floor spacing of 9-12 m^2 per layer.
- For the open-sided houses both for layers and broilers, make a width of not more than 7-8 m.

- If the width of the shed is more than 8 m, use ridge ventilation at the middle line of the roof top. In this case, the floor space requirement per bird for different age group is different as indicated in the table below:

Age in weeks	Minimum floor space per bird (cm^2)
0-4	450
5-10	900
11-20	1,350-1,800
Layers above 20 weeks	1,800-2,250

A simple sketch of the poultry shed



2. Health management for poultry

- Provide a healthy environment for the chicks and protect them against common contagious and infectious diseases in Bhutan as indicated below.

Disease and Cause	Symptoms	Prevention	Cure
1. Ranikhet disease (New castle) Caused by: *Filterable virus*	a) In chicks: • Coughing and rattling, gasping, and trembling • Lack of coordination • Partial or complete paralysis of extremities • Muscular tremor • Abnormal movements • Mortality up to 100% b) In adults: • Respiratory distress • Impaired appetite • Nervous symptoms • Severe drop in egg production • Soft shell and poor quality eggs	• F1 strain vaccine for chicks 1-6 days old • R2B Mukteswar strain vaccine at 8 weeks of age • Minimise secondary complications by stimulating appetite with wet mashes, pellets, high level antibiotic mashes, or antibiotic-vitamin mixture in drinking water	• No treatment
2. Infectious Bursal Disease (IBD) Gumboro disease Caused by: *Birna viridae*	• Enlarged bursa in the early stages and in later stages atrophied by the regression of the bursal gland • Defective immune system making chicks susceptible to many diseases like Ranikhet despite vaccination • Affected chicks become dull, depressed, go off feed, have tendency to peck at their own vents, and huddle in corners • Whitish diarrhoea leading to weakness and death in 5-7 days • High morbidity (80%) and low mortality (2-10%)	• Attenuated strains of live Gumboro vaccine	• No specific treatment with antibiotics

Disease and Cause	Symptoms	Prevention	Cure
3. Lymphoid leucosis or big liver disease Caused by: *Filterable virus*	• Difficult to detect in the early stages • Enlarged and distended abdomen • Slight drop in feed consumption and egg production • May adopt penguin sitting posture • Sick birds are usually not paralysed during the early stages	• Purchase chicks with no history of early leucosis	• No known treatment
4. Marek's disease Caused by: *virus*	• Most birds have some degree of paralysis, although chickens with acute form may not show this condition • Birds with paralysis may die because they are unable to reach feed and water. The acute form generally affects younger birds (6-10 weeks) • Usually sudden death with a high rate and definite peak in mortality; in some outbreaks, paralysis may be seen. Classical form (3-5 months age) • In mature birds, symptoms include various degrees of paralysis of legs/wings or neck; marked loss of weight; difficult breathing and sometimes diarrhoea; skin lesions are usually associated with feather follicles	• Vaccination with Herpes virus turkey vaccine (HVT) at one day of age for lifetime protection • Good sanitation and hygiene	• None

Disease and Cause	Symptoms	Prevention	Cure
5. Chronic respiratory disease (CRD) Caused by: *Mycoplasma gallisepticum*	• Sniffling, rattling, sneezing, nasal discharge, swollen sinuses, eyes and other signs of respiratory distress • Loss of appetite • Drop in egg production • Spreads slowly through flocks (in contrast to fast spreading bronchitis and respiratory disease)	• Periodic testing for Mycoplasma infections • Dipping hatching eggs in effective antibiotic solution prior to incubation • Correct faulty management	• Use tetracyclines, tylosinephos-phate, and erythromycin in feed and water
6. Fowl pox Caused by: *Filterable virus*	• Pox lesions on comb, wattles, and legs • Loss of appetite • Discharge from nostrils and accumulation of foamy material in the corner of the eyes • Cheesy membrane in mouth • Birds suffer from suffocation unless membrane is removed • Drop in egg production • Mortality as high as 50%	• Pigeon pox vaccine for laying birds	• Remove necrotic membrane from mouth and larynx of affected birds • Stimulate appetite with wet mash or add antibiotic-vitamin mixture in drinking water
7. Fowl typhoid (Pullurom disease) Caused by: *S. pullorum*	• Sudden death • General listlessness • Huddle together • Appear chilled • Droopiness • Closed eyes • Whitish pasty diarrhoea • Little or no appetite • Irregular labored breathing • Peculiar chirp • Comb and wattles pale	• Hatchery and flock sanitation • Do not use recovered birds for breeding unless negative to repeated tests	• Use neftin sulfathiazole, sulfamerazin, and sulfaquinoxa-line in mash or drinking water for a few days

Disease and Cause	Symptoms	Prevention	Cure
For internal parasites			
8. Coccidiosis Caused by: *Eimeris tenella* or *Eimeria necatrix*	• Bloody droppings • Blood tinged diarrhoea • Dehydration of comb • Droopy birds • Drop in feed consumption and egg production • Emaciation • High rate of mortality unless checked	• Good sanitation • Keep litter dry and unpacked • Continuous low level use of cossidiostat in feed with good management	• Use amprolium, codrinal, embazin, bifuran, coxystat, and zoalene • Do not continue treatment for long period
9. Tapeworms Caused by: *Raiilietina enchinobothrida* or *R. tetragonal*	• Loss of appetite • Loss of weight • Diarrhoea • Emaciation • Drop in egg production	• Ensure dry litter	• Use dicestal or phenothiazine
10. Roundworms Caused by: *Ascaridia galli*	• Loss of weight • Drop in egg production • Emaciation	• Ensure dry litter	• Use piperazine adipate, verban, or vermex
11. Cecal worms Caused by: *Heterakis galline*	• Ceca inflamed and thickened weakness • Anaemia	• Ensure dry litter	• Use piperazine adipate, verban, or vermex

- Vaccinate the chicken at appropriate age to prevent flare-up of diseases using the common vaccination schedule as indicted below:

Age	Type of Vaccine	Route of Vaccination/Remarks
1 day	Marek's disease vaccine (HVT)	• Subcutaneously or intraperitoneally • Check hatcheries and release chicks only after Marek's vaccination if it is bought from the farm
5th day	Ranikhet disease (RB1 or La Sota)	• Intransal and intraocular method • Maternal antibodies will neutralize vaccine virus when administered on the first day. Do it on the 5th day
10 Days	Gumboro disease vaccine (Live strain)	• Intraocular method or drinking water method.

Age	Type of Vaccine	Route of Vaccination/Remarks
3rd week (21 days)	Gumboro disease vaccine (Live strain)	• Intraocular method or drinking water method. • Maternal antibodies are present in chicks up to 2-3 weeks. Vaccinate only on 20th day
32 days	Gumboro disease vaccine (Live strain)	• Drinking water method
6 weeks	Fowl pox	• Wing web puncture method
8-10th week	Ranikhet disease vaccine (living) R_2B strain or Mukteswar strain or Kumarov strain (RDVK) Booster dose	• 0.5 ml inoculated subcutaneously
9th week	Fowl pox vaccine living (FPV)	• Wing web puncture method
15-17th week	Ranikhet disease vaccine (living) R_2B strain or Mukteswar strain or Kumarov strain (RDVK) Booster dose	• 0.5 ml inoculated subcutaneously
42nd week	Ranikhet disease vaccine (living) R_2B strain or Mukteswar strain or Kumarov strain (RDVK) Booster dose	• 0.5 ml inoculated subcutaneously

3. Poultry husbandry practices

a) Management of chicks

Feeding

- Fill the flat feed and water trough before the chicks arrive. Place the flat feed trough half inside and half outside the brooder.
- Cover the litter during the first three days with old newspapers.
- Spread the feed on newspapers for the first few days with the papers replaced every 24 hours.
- Feed the chicks with chick starter mash, broken rice, or fine ground maize grit (smaller than 0.32 cm in diameter).
- Start feeding as soon as the chicks arrive. Do not leave the chicks in hungry condition 24 hours from hatching. Chicks require 2 kg chick mash up to 8 weeks.
- Provide water in a water trough and free of contamination. Prevent spill-over that can wet and damp the litter.

Lighting

- Provide less than week-old chicks with continuous light (40 watt bulb per 3 m^2) from day-old to 8 weeks of age.
- Follow regular deworming and vaccination as per schedule.

b) Management of growers

Feeding

- Feed grower mash from the 9^{th} week or when chicks have consumed 2 kg of chick mash.
- Fill the feed trough one third at a time and offer feed thrice a day.
- Control feeding partially from 14 weeks onwards in case birds are overweight. Pullets require 6 kg of feed from the 9-20^{th} weeks of age.

Lighting

- Rear growers from 9-20 weeks under natural light or 14 hours light.

c) Management of layers

Selection of pullets

- House only well-developed pullets. With careful selection, there is no need to do much culling with suitable strains of layers until the birds have been laying for 7-8 months.
- Avoid excessive handling. Remove sick or injured birds immediately.

Floor space and litter

- Provide 0.3-0.45 m^2 of floor space per bird on deep litter.
- Always provide new litter for the flock being housed unless the birds have been grown in the same house.
- Keep the litter dry.
- Remove wet patches of litter promptly.

Laying nests

- Introduce nest boxes in the laying house two weeks before the onset of lay.
- Provide one nest box for every 5 layers.
- Always provide clean nesting material and change periodically.

Water

- Provide 2.54 cm water trough space for every bird or two single 10 litre water trough for 100 birds. Or use 1 meter trough type automatic water trough accessible from both sides.
- Do not allow the bird to walk more than 3 m to drink water.

Feed

- At 20 weeks of age or 5% egg production, whichever is earlier, fed the birds with layer mash.
- Ensure that there are at least 12-45 cm diameter tubular feed troughs per 100 birds or alternatively 15 cm of trough space per bird.
- Feed the layers two times a day, that is, once in the morning and once in the afternoon. Or three times a day if labor is available.
- Always be cautious about minimising feed wastage if it can not be totally prevented. Follow the feeding practice of farms as indicated below:

Parameters	**Chick mesh**	**Grower mesh**	**Grower and layer mesh mixed**	**Layer mesh**
Age (weeks)	0-8	9-17	18-20	21
Quantity (g)	10	90	100-120	130
Remarks	increase 5-10 g until it reaches 90 g	increase 5-10 g until it reaches 120 g	5% birds already starts laying, so start feeding layer mesh too	Fixed
Quantity consumed	0.56	3.78	2.31	46.41
Note: Total consumption in 72 weeks of age is 53 kg				

Culling

- Cull unproductive birds, that is, those which do not lay eggs or very few eggs.
- If a high percentage of layers from a good strain have stopped laying before completing a full cycle of at least 12 months after laying the first egg, check for faulty management or feeding before culling the layers. Keep in mind the following items to help prevent such cases:

  a) If the water troughs remain without water for several hours, adopt a fixed routine for cleaning and filling the water troughs of which a sufficient number must be supplied. If automatic water troughs are used, check frequently to see that they are in proper working order and remove deposits from time to time.
  b) If feed is provided irregularly or if feeding space is inadequate, provide enough feed troughs and always keep filled. Never allow them to stay empty for prolonged periods.
  c) If layers get sick, follow vaccination rules vigorously and keep house spotlessly clean. Avoid feed and water spillage.
  d) If hens become broody, keep them for a couple of days in a ventilated cage, with a wire or bamboo floor hanging up in the house. Always close the nests at night. Or give the hen two tablets of aspirin for two consecutive days.

- Make sure to detect non-layers, and after a time, poor layers using the table below:

Characteristics	Good layer should be	Non-layer (culls) will be
1. Health	• Active, alert, and well fleshed	• Dull, thin, or over-fat
2. Head	• With stout beak and flat skull	• Small beak, narrow, and arched skull
3. Comb	• Full, waxy, and pale of bright red	• Shrunken, dry, and scaly
4. Back	• Long broad and flat	• Short, narrow and arched
5. Vent	• Large, moist, and dilated	• Small, dry, and narrow
6. Capacity	• 4-5 finders distance between end of breast bone and the pelvis • Large pelvic span 2-4 fingers	• Only 1-2 fingers between breast bone and pelvis • Pelvic bones close together
7. Moult	• Late and rapid moulting	• Early and slow moulting
8. Broodiness	• Seldom if ever broody	• Frequently broody
9. Plumage	• Broken and faded	• Bright glassy

Flock replacement programme

- As pullets begin to lay at 20-22 weeks with substantial production in 26 weeks, maintain an even supply of eggs from a poultry farm.
- Arrange to purchase or make ready replacement chicks approximately 26 weeks before the previous flock is disposed.

Disposal of old hens

- Dispose old hens at the same time when they reach 18 months of lay or when egg production starts to drop to less than 45% hen-day, whichever comes first. To compute for % hen-day egg production, multiply the total number of eggs by 100 then divide by total hen-days.

d) Records, profits, and efficiency

- In each poultry house, keep a daily record in a sheet or card of the egg production, mortality and culls, and feed consumption.
- Keep a record of all items of income and expenditure.
- Keep a master record of the number of chicks and layers housed, date of housing, hatchery from which they were obtained, and number of square metre per bird.

- Assess the cost of rearing pullets to point of lay and then assess separately the profitability of the layer operation. In all costing, analyse the income and expenditure under the following classification:

Expenditure	Income
1. Day old chicks/cost of point of lay	1. Culls
2. Feed	2. Egg/meat sale/live sale
3. Labor	3. Manure
4. Lighting	4. Sale of gunny bags
5. Litter	
6. Medication	
7. Depreciation on buildings and equipment	

e) Feed formulation

- Before proceeding for feed formulation, check the availability of quality raw materials and their cost; feed analysis values, requirement of formula for nutrients, and maximum level of inclusion of feed ingredients.
- Use the guide below in formulating balanced poultry feeds, that is, the recommended ration (per 100 kg of feed) for various age groups of layers:

Composition	Unit	Chick mash (0-8 weeks)	Grower mash (8-20 weeks)	Layer mash	
				Phase I (20-45 weeks)	Phase II (45-80 weeks)
1. Yellow maize	kg	29.0	26.0	35.0	40.0
2. Rice polish	kg	33.7	43.8	32.1	31.1
3. Wheat bran	kg	-	2.0	-	-
4. Groundnut cake	kg	22.0	13	17	12.5
5. Fish meal	kg	10.0	7.0	6.0	6.0
6. Lucerne meal	kg	3.0	3.0	3.0	3.0
7. DL-methionine	g	40.0	-	-	15.0
8. Molasses	kg	-	3.0	-	-
9. Mineral mixture	kg	2.0	2.0	3.0	3.0
10. Rovimix (Vitamin A+ B_2 +D_3 supplement)*	g	20.0	20.0	30.0	30.0
11. APF Vitamin B12 supplement*	g	20.0	20.0	20.0	30.0
12. Vitamin K	mg	10.0	10.0	10.0	20.0
13. Vitamin E	mg	20.0	20.0	20.0	10.0
14. Potassium iodide	g	20.0	20.0	20.0	20.0
15. Manganese sulphate	g	5.0	3.0	3.0	20.0
16. Zinc carbonate	g	8.0	5.0	3.0	3.0
17. Shell grit	kg	-	-	3.8	3.0

18. TM-25 (antibiotic supplement*	g	50.0	50.0	50.0	403.0
19. Neftin-50*	g	100.0	100.0	-	50.0
20. Amprol*	g	50.0	32.0	-	-

* Corresponding products to other brands can be used in its place at doses recommended by manufacturers.

References:

1. C. A. Gopalkrishnan and G.M.M., 1994. Livestock and Poultry Enterprises for Rural Development.
2. Ganesh Saha, 1975. Animal Treatment.
3. V.A. Sapre, 1996. A Handbook for Veterinary Physician.
4. M.R. Gnaanamani, 1996. Modern Aspects of Commercial Poultry Keeping.

Pig Description



Pigs, zoogically called *Sus scrofa* and belonging to the swine family, are one of the most important small animals in Bhutan along with poultry. Locally, it is called *phap* (in Dzongkha) or *phagpa* (in Sharchopkha).

Rural Bhutanese farmers rear pigs for meat during especial occasions while others rear them as additional income for the households. The reared breeds are mostly local, but some are exotic or their crossbreeds. Local pigs are preferred over exotic ones for meat quality. However, rearing of exotic breeds for piglet and pork production gives farmers higher economic benefits over local breeds.

Practically, pigs are raised throughout Bhutan, except in Bumthang. Like poultry, the southern Dzongkhags lead in production. Each household raise an average of 1-2 pigs. Average meat production per household for local breed is 60 kg per pig while improved ones turn out 100-200 kg per pig. The average annual rearing cost is Nu 2,000 per local breed and Nu 5,000 per improved breed. In 2006, the pork fetches an average price of Nu 120/kg.

In Bhutan, pigs are generally used as food and its dung as manure. Some Bhutanese process the pork into sausage and *sikam* (dry pork). Bhutanese consumes an average of 0.287 kg of meat per year (Renewable Natural Resources Statistics, 2000). Like poultry, Bhutan imports pork from India to meet the demand.

The extension agents provide technical support on pig production to farmers with technological support from RNR research experts.

TECHNOLOGY FOR PIG PRODUCTION IN BHUTAN

By

Mr. Dawa L. Sherpa
Research Assistant 1
Renewable Natural Resources Research Centre Bajo, Wangdue Phodrang
Tel. No. +975-02-481209
E-mail address: seldendrup@yahoo.com

I. PRE-PRODUCTION STAGE

A. Growing Conditions

Criteria	Description
1. Altitude	• Up to 3,400 metres above sea level (masl) • At higher altitude (>3,500 masl), growth is hindered by cold resulting to poor performance in terms of piglets and meat production even though the management is good
2. Temperature	• From 0^0-42^0C. Above and below this temperature (0^0-42^0C), the performance will be affected.
3. Slope	• From plain to 45^0 slope (where there are human settlements). At this slope, there is no effect on pigs and pig farming

B. Choice of breeds

- Choose either local breeds (*Sa fag*) or improved (*Drem fag*) or exotic breed like *Bja fag* or *Bela fag* based on preference and immediate needs.
- If one is unable to decide, seek advice from Geog extension agents.

Main Characteristics of Pig Raised in Bhutan

Exotic pig

- Developed mostly by the Europeans
- Meat is acceptable in local markets
- Can be raised in nine months for meat production
- Larger litter size
- Greater economic return



Exotic pig
(Photo courtesy of RNR RC Bajo)

Crossbred

- Developed and available with farmers
- Meat is acceptable in local markets
- Can be raised in nine months (80-100 kg) for meat production
- Better meat quality (sikam)
- Better disease resistance than the exotic breeds



Crossbred
Photo courtesy of RNR RC Bajo

Local pig

- Developed by Bhutanese farmers or originated in Bhutan
- Meat is acceptable in local markets
- Can be raised in nine months (60 kg) for meat production
- Tastier meat quality (sikam)
- Better in terms of disease resistance



Local pig
(Photo courtesy of RNR RC Bajo)

II. PRODUCTION STAGE

a) Housing for pigs

For commercial farms (more than 10 pigs)

- Provide a permanent central house with or without attached paddocks. Follow the floor space requirement for different age groups as indicated below:

Class of swine	Floor space per animal (sq m)
1. Growing pigs	
• 15-35 kg	0.36
• 35-55 kg	0.47
• 55 kg to market weight of 100 kg	0.74
2. Brood sows and boars	1.40

- Construct the house on a good foundation in an elevated, well-drained site. Keep it away from dwellings and the dairy farms.
- If possible, use brick and mortar to construct the walls of the building and the pens within.

- Keep the floor concrete and its level at least 5 cm higher than the outside floor.
- Provide two rows of pens with a central path within the building. Provide each pen an inner part to keep the feed trough and water trough and an outer open run. Partition between pens need not be complete, but to a height of about 1.5 m and made of brick or boulders. Provide an underground gutter along the end of the pens to carry the wash water away.

Under farmers' condition

- Follow the improved pig housing as shown in the photos.



Improved version of traditional pig shed (Photo courtesy of RNR RC Bajo)



Improved pig shed (Photo courtesy of RNR RC Bajo)

Housing plan for 10 sows, 1 boar and a farrowing room

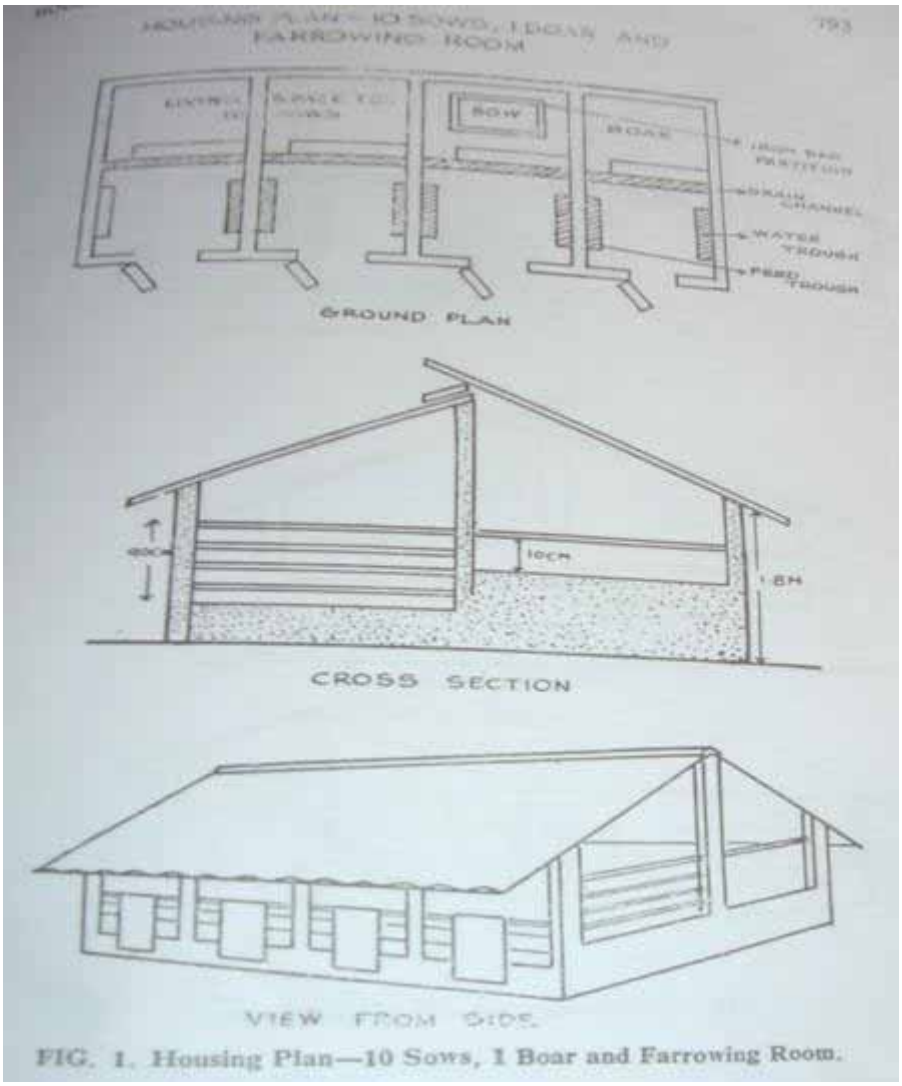


FIG. 1. Housing Plan—10 Sows, 1 Boar and Farrowing Room.

b) Health management for pigs

- Keep the pigs healthy and protect them against diseases to avoid heavy losses.
- If the disease is hereditary in nature like haemophilia, umbilical and inguinal hernias, and anatomical deformities, avoid using the animals for breeding which are found to carry the undesirable genes.
- Follow the general precautions below to avoid infectious diseases caused by viruses, bacteria, fungi, and parasites:

Disease and Cause	Symptoms	Prevention/Treatments
1. Swine Fever (Hog cholera) Caused by: *Salmonella cholerae*	• In pre-acute cases, young pigs die without any preliminary symptoms • In acute cases, the temperature is usually very high (38.7^{o}-39.4^{o}C) and the animal becomes dull, have severe conjunctivitis with purulent discharge, nervous signs like convulsions and tremors, followed by terminal coma	• Inject hyper-immune serum in early stages with 50-150 ml dose • Swine fever vaccine after six weeks of age with dose of 1 ml of reconstituted vaccine sub-cut inside thigh. Immunity is one year
2. Swine influenza Caused by: Virus	• Affects mostly young pigs • Severe fever • Loss of appetite • Respiratory distress • Liquid discharges from the nostrils and eyes	• No specific treatment • Provide ailing animals with warm bedding and protect from cold
3. Swine pox Caused by: Virus	• Young animals are seriously affected • Fever • In-appetence and eruptions on ears, neck, inferior abdomen, and inner aspects of the thighs and in very severe cases, in other parts of the body	• No specific treatment • Provide ailing animals with warm bedding and protect from cold
4. Foot and mouth Caused by: *Aphto virus* *Strains – A. O. C. Asia 1*	• Severe depression • Off-feed • Acute painful stomatitis • Salivation • Careful chewing • Vesicles and bullae formation on the buccal mucosa and on the dental pad and the tongue, thin-walled vesicles lameness • Recumbency • Painful swelling of coronet formation of vesicles on teats and natural openings (orifices) • Abortion • Infertility • Loss of condition • Decreased milk yield	• No specific treatment • Use antibiotics to control secondary infection • In severe cases, use the blood from recovered or vaccinated animals for transfusion particularly on young calves to avoid acute fatal attack • Use levamisol at 1 ml per 30 kg body weight sub-cut to correct immune deficiency and to hasten recovery

Disease and Cause	Symptoms	Prevention/Treatments
5. Anthrax Caused by: *Bacillus anthracis*	• High fever (Hyperpyrexia) • Bleeding from natural orifices • Sudden death	• Use terramycin or oxysteclin in high doses • Use anthrax spore vaccine at 1 ml sub-cut. Immunity is one year
6. Brucellosis Caused by: *Brucella abortus*	• In females, abortion, birth of weak or dead piglets and sterility and infertility • In boars, inflammation of the testicles and joint, and sterility or infertility	• Use streptomycin and chloramphenicol with prolonged treatment at high dose • Use oxytetracycline at 10 mg given intra peritoneum as a single dose repeated after 30 days
7. Round worm Caused by: *Neoascaris vitulorum*	• Young animals are seriously affected • Poor growth • Lower resistance • Enzootic pneumonia • Poor coat • Diarrhoea • Occasional colic • Convulsion • Intestinal obstruction	• Use piparazine adipate calf at 8-10 g mixed in feed and repeat at six months of age • Use panacur at 5-10 mg/kg body weight
8. Tape worm Caused by: *Moniezia expansa and M. benedini*	• Diarrhoea • Un-thriftiness • Constipation • Loss in weight • Presence of worms and eggs in the faeces • Pot-bellied	• Use niltape at 2.5-5 g for calves • Use praziquantel 50 mg tabs at 1 tab per 10 kg body weight. Repeat at six weeks interval
9. Lung worm infection Caused by: *Metastrongylus apri*	• Infected pigs seriously suffer and die in large numbers • The worms occupy the lung tissue in large numbers occluding the lung passages causing severe respiratory distress and death • Young pigs up to four months are most susceptible to worm infestation	• Ivermectin injection

Disease and Cause	Symptoms	Prevention/Treatments
10. Skin diseases Caused by: *Lice and mange mites*	• In lice infestation, skin lesions start mostly on the back of the ears and between the legs. Scratching is an indication • Sarcoptic mange mites burrow into the skin where it feeds and multiplies • Demodectic mite infests hair follicles and sebaceous glands. Infection causes severe irritations making the pig restless, scratch against wall or fences, and do not eat properly. Open wound may cause screw worms or other infections	• Apply butox, malathion, methoxychlor, and similar drugs as spray or dip. Do not slaughter treated animals for about 30-40 days to avoid residual effect
11. Piglet anaemia Caused by: *Iodine deficiency*	• Severe anaemic symptoms and respiratory distress • Piglet borne premature and those belonging to too large a litter size suffer more	• Swab saturated iron sulphate solution on the sow's udder so that piglets may get enough iron while suckling • Iron injection at three days old

c) Feeding and water requirements

- Use the feeds and feeding regime as indicated below:

Class of pigs	Feed required (kg)
1. Growing pigs	
• 10-25 kg	1.0-1.5
• 25-50 kg	1.5-2.5
• 50-100 kg	2.5-3.5
2. Pregnant gilt	2.5
3. Bred sows first 12 weeks	2.5-3.0
4. Bred sows beyond 12 weeks	3-3.5.0
	5-6 depending on litter size/milk flow
5. Adult boars	2.5-3.0

- Provide the pigs clean, fresh water at all times but not highly chilled water. Supply warm water during winter season. Pigs on an average consume 2-3 times by weight of their dry feed intake as indicated below:

Class of pigs	In litres
1. Boars and sows	10
2. Lactating sows	25
3. Piglets (up to three weeks of age)	5
4. Pigs (10 weeks old)	5
5. Adult pigs (market pigs or feeder pigs)	5-10

d) Feeding and watering equipment

- Under farmer's condition, use locally designed strong wooden feeders and waterers made out of cylindrical tree trunk.
- Under concrete and permanent housing systems like in the farms, attach concrete feeder and water trough to the inner walls of the pen or rise from the floor. Provide 30 cm of feeding space for four growing pigs or two adult pigs but increase to 45 cm for large size of breeding stock**.**

e) Weaning of piglets

- Under semi-intensive conditions, allow the piglets a long suckling period and wean them at 12 weeks after birth.
- For intensive management systems, wean the piglets a little early. Usually with two litters in a year, wean at 7-8 weeks after birth. Under any circumstances, wean the piglets earlier than three weeks.

f) Breeding time

- Take note that the sow comes to heat once in 21 days with duration of about 2-3 days. The following are the cardinal signs when the sow is nearing the heat period or is in-heat:

    1. Just prior to the onset of heat, vulval lips become swollen and congested followed by a slight discharge. The swelling of the genitalia continues throughout the entire period of heat.
    2. The sow in-heat becomes restless, grunts in a peculiar fashion, sniffs at the genitalia of the other sows, and tries to mount on them.
    3. Pressing the posterior part of the body towards the wall, standing calmly to be mounted, or remaining standstill when the back of the sow is firmly pressed.

g) Farrowing time

- Record the breeding date to know the farrowing time prior hand.

- Shift the sow to a separate farrowing pen if available or provide liberal amount of bedding materials chopped out of hay or straw in the same pen 3-4 days before farrowing. The sow digs deep down into the bed or makes her nest about 12 hours prior to farrowing. Take note that uncut straw or long chopped hay may entangle the new piglets.
- Protect the corner where the sow lies with guard planks to prevent squeezing of the piglets by the sow in case it rolls over them. Or provide a separate farrowing crate with a creep arrangement.
- Ensure that the farrowing pen is dry, well-ventilated, and lighted by allowing passage for direct sunlight.

h) Management of market pigs

- Slaughter the porkers at the live weight of 70-75 kg. Their meat is lean with more protein and less fat.
- Slaughter the bacons at a live weight of about 90 kg. Their meat contains more fat than pork.
- Slaughter heavy hogs at a live weight of about 120-150 kg. Their meat is highly laden with fat.

References:

1. C. A. Gopalkrishnan and G. M. M., 1994. Livestock and Poultry Enterprises for Rural Development.
2. Ganesh Saha, 1975. Animal Treatment.
3. S. K. Ranjhan, 2004. Animal Nutrition in the Tropics.

Bamboo Description



Bamboos, commonly grown as woody plants, belong to the family *Gramineae,* and form the tribe *Bambuseae* of the subfamily *Bambusoideae.* They often have tree-like habit and can be characterized as having woody usually hollow clumps, complex rhizome and branch systems, petiolate leaf blades, and prominent sheathing organs.

Bamboo species in general are distributed throughout Bhutan, though they are most common in the higher rainfall areas; also in the periphery of rice fields. They can grow from the Tropical Southern borders to the tree line where they form extensive areas of pasture for higher altitude animals like yak and sheep. Locals call them *ba* (in Dzongkha) or *she* (in Sharchopkha).

It takes five years in Bhutan to get the first harvest for bamboo, although it is productive for around 100 years making it a potential cash crop. A bamboo piece sells for around Nu 80-90 and considering the demand, Bhutan is also importing much from India. Bamboos are used as poles, posts, and furniture, among others.

The Ministry of Agriculture extends technical support to growers along with the extension agents.

TECHNOLOGY FOR BAMBOO PROPAGATION IN THE NURSERY IN BHUTAN

By

Mr. Rinzin Dorji and Mr. Yog Raj Chhetri
Forestry Research Assistants
Renewable Natural Resources Research Centre Bajo, Wangdue Phodrang
Tel. No. +975-02-481209
E-mail address: rinzin@druknet.bt or dorji_r@yahoo.com

I. PRE-PRODUCTION STAGE

A. Growing Conditions

Criteria	Description
1. Altitude	• Grows only up to 1,600 metres above sea level (masl)
2. Soil pH	• No data available
3. Soil texture	• No data available
4. Temperature	• No data available

B. Choice of Variety

There are two genuses, that is, *Dendrocalamus* and *Bambusa*, for which growers can choose from. The following species can adapt to Bhutan conditions, namely: *Dendrocalamus strictus*, *Dendrocalamus calastachyous*, *Bambusa bamboo*, and *Bambusa arundinacea*.

II. PRODUCTION STAGE

1. Propagation of Bamboo seedlings, *Bambusa* and *Dendrocalamus spp.* Dz. Pashi

Locally, there are three propagation techniques for bamboo. One is through rhizomes which farmers collect from the source and directly plant in the field. Another one is through internodes in which farmers cut the shoots of mature clumps with two to three remaining internodes and then bury under the soil until new shoots and roots (layering) emerge. The other commonly practiced and effective propagation method is through the seeds which are usually practiced in the nursery for mass multiplication. This package of technology will discuss mainly on propagation techniques through seeds and mass production of planting materials as follows:

- Soak the seeds in cold water for 10-12 hours.

- Sow the seeds via broadcast in a well-prepared seedbed, preferably between March and July. Cover the seeds with a thin mixture of soil, sand, and top soil (1:1:1). Or sow 3-4 seeds in a plastic tube to 5 mm depth.
- Keep the seedbeds moist all the time.
- Apply appropriate chemicals based on the causal agent.
- When the seedlings are three months-old (with 5-10 cm height), pull out a seedling from one single seed and detach the rhizomes. A single seed can be multiplied in as many as 3-5 seedlings, or if there are 100 good seedlings raised from seeds, one can produce a minimum of 300 seedlings in a year.



A clum of seedlings from single seed (Photo courtesy of RNR RC Bajo)



Propagules separated from the single clum (Photo courtesy of RNR RC Bajo)



Propagules ready for potting as single seedling (Photo courtesy of RNR RC Bajo)

Pangtse Description



Pangtse or botanically called *Symplocus paniculata* (Thunberg) Miquel is a deciduous shrub to small tree (3-10 m) that is popularly grown in the temperate zone. Its black to bluish-black berry contains edible oil better than mustard oil, particularly the essential fatty acids (linolic acid; 19.2%) based on the study conducted by the Centre for Agriculture research and Development (CARD) in Bajo. The oil extracted from its seeds has a black colour with a unique aroma.

In Bhutan, the tree is called *pangtseshing* (in Dzongkha) and is usually grown on the bunds of the rice terraces, particularly in Punakha and Wangdue Valley. Depending upon the altitude, Pangtse flowers in May to June and the fruits ripens in October to December. Since time immemorial, the growers used the seeds as a substitute for or complement with mustard oil.

Due to the oily nature of the seeds, it is very difficult to propagate through seeds and thus, farmers propagate them via vegetative means. The Ministry of Agriculture, through the Forestry Sector of the Renewable Natural Resources Research Centre in Bajo, is providing technical support for those who may want to initiate propagating this species.

TECHNOLOGY FOR PANGTSE PROPAGATION IN THE NURSERY IN BHUTAN

By

Mr. Rinzin Dorji and Yog Raj Chhetri
Forestry Research Assistants
Renewable Natural Resources Research Centre Bajo, Wangdue Phodrang
Tel. No. +975-02-481209
E-mail address: rinzin@druknet.bt or dorji_r@yahoo.com

I. PRE-PRODUCTION STAGE

A. Growing Conditions

Criteria	Description
1. Altitude	• Grows only from 1,600-2,850 metres above sea level
2. Soil texture	• Moist dry to clay soil

B. Choice of Variety

In Bhutan, the species has only one variety to choose from, which is *Symplocus paniculata* (Thunberg) Miquel.

II. PRODUCTION STAGE

Propagation methods

Locally, pangtse can be propagated through seeds, stem cuttings, and root cuttings. Research revealed that propagation through seeds is better for mass multiplication.

A. By seed

a) Seed collection

- Collect the seeds in October to December. Make sure that the 'Mother Tree' should have good tree form and the tree should be free of pathogens.
- As soon as the seeds are harvested, rub the outer oily portion of the seeds and soak the clean ones in cold water for 5-6 days.



Ripened berries
(Photo courtesy of RNR RC Bajo)

- If seeds are to be stored for short duration, keep them in a freezer. For longer storage, dry the seeds.

b) Sowing medium

- Prepare a medium of topsoil, sand, and saw dust (2:2:1 mixture).

c) Seed sowing

- Pre-treat the seeds immediately after collection.
- Prepare a mother bed with proper shedding.
- Sow the treated seeds by broadcasting, dibbling, or in lines, at 5-8 cm deep.
- Water the seeds at least once a day under dry condition and twice a week under humid conditions to keep the beds moist.
- Do weeding as needed to prevent the germinating seedlings from suppression.

d) Pricking out

- When true leaves appear, prick out the seedlings to the polyethylene bags filled with mixture of sand, soil and leaf mold (1:1:1).
- Place the bags inside the shed for at least a month. Arrange the bags in such a way that it avoids direct sunlight.
- Water the seedlings thrice a week. Prick out weeds from the bags.



Pricked-out Pangtse seedlings (Photo courtesy of RNR RC Bajo)

e) Hardening

- Once the seedlings are fully established in the shed, gradually move them out in the open environment.
- Keep the seedlings in the open for 2-3 weeks before planting in the field.



Semi hardened seedlings (Photo courtesy of RNR RC Bajo)

f) Planting

- Use 9-10 month-old seedlings and plant them during raining season.
- Dig a pit with a minimum size of 930 sq. cm. for planting seedlings.

B. By vegetative cuttings

a) Stem cutting

- Collect cuttings from a tree that is about to set new leaves after dormancy (that is, February-March).
- Collect branches of thumb size and 25-30 cm long for cuttings.
- Put the collected cuttings in an icebox or a water-soaked sack.
- Raise the cuttings in a sunken mother bed with proper shed. Prepare the sunken mother bed as follows:
  - 60-90 cm deep x 1 m wide and convenient bed length or 2-3 ft deep x 3 ft wide and convenient bed length;
  - Fill the bottom of the bed with gravel up to 3-5 cm; and
  - Above the gravel, fill the bed with prepared medium of sand, soil, and saw dust in the ratio of 1:1:1 up to 45-60 cm.
- If possible, apply rooting hormone such as indolebutyric acid (IBA). Actual root formation takes 4-5 weeks.

b) Root cutting

- Collect roots of thumb size and 13-15 cm long.
- Plant the cutting in the manner that root grows under normal condition (thick end up) but put it deeper into the growing medium (prepared mother bed) keeping roughly 1 cm exposed for new shoots to sprout.

Annex 46. Evaluation results of the pre-testing of nine information materials with extension agents as accompanied by Bajo researchers

Parameters	Rice	Pest Mgt	Walnut	Chili	Tomato	Pig	Poultry	Bamboo	Pangtse
Persuasiveness									
1. Did you like the pictures?	Yes	Yes	Yes	Yes	Yes	Yes, very clear to view, easy to understand, three photos should be given due courtesy to Limbu not Bajo	Yes, very clear to view, easy to understand	Yes, photos are clear and size is ok	Yes, photos are clear and size is ok
2. What can you say about the size of the pictures?	None/Just right	Small for rice node blast/Just right	Just right	Just right	Just right	Just right	Just right	Just right, but enlarge if possible	Just right, but enlarge if possible
3. Did you like the font (or the type of letters) used in the information material?	Yes	Yes	Yes, clear	Yes, clear	Yes, clear	Yes, readable even from certain distance; well-designed/ very clear and right size of letter	Yes, readable even from certain distance; well-designed/very clear and right size of letter	Yes, clear	Yes, clear
Clarity									
4. Did you understand the message of the information material?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Did you get additional knowledge through this information material?	Yes	Yes	Yes , informative	Yes, informative	Yes, informative	Yes, we know more information from all good package of practices	Yes, we know more information from all good package of practices	Yes (3), got more information since hardly know about bamboo	Yes (3), got more information since hardly know about pangtse

Parameters	Rice	Pest Mgt	Walnut	Chili	Tomato	Pig	Poultry	Bamboo	Pangtse
6. Is there a message that you do not understand in the information material?	Yes, some lengthy paragraphs were used/ No	No	Yes, some technical words were used (e.g. undercutting, stratification)/ No	No	No	No but need to include feed formulation of pig ration like feedstuff requirements	No	No	No
Acceptability									
7. In your own opinion, are the messages of the information material right?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8. Are the pictures acceptable?	No, few of them are small/Yes	No, few of them are small/Yes	Yes, clear view	Yes, clear view	Yes, clear view	Yes, clear and accurate size/ very clear/ Village level photos are used but additional photos can be sent by extension agents	Yes, clear and accurate size/ Very clear/ Village level photos are used but additional photos can be sent by extension agents	Yes, clear	Yes, clear
9. Are the words acceptable?	Yes	Yes	Yes, simple and understandable	Yes, simple and understandable	Yes, simple and understandable	Yes, easily readable/ technical words can be understood easily	Yes, easily readable/ technical words can be understood easily	Yes, familiar	Yes, familiar
10. Overall, is the information material acceptable?	Yes	Yes	Yes, very informative	Yes, very informative	Yes, very informative	Yes	Yes	Yes, informative	Yes, informative

Annex 47. Training programmes for VERCON-Bhutan

Training Programmes		
Initial Proposed Training Programmes (18 September 2006)	With FAO Mission (24 November 2006)	Final Training Programmes (28 November 2006)
1. Use of communication equipment (such as digital camera and the 4-in-1 equipment-printer, photocopier, scanner, fax)	1. Equipment • Use of 4-in-1 equipment-printer, scanner, photocopier, fax, and the digital camera • Computer switch it on and off, download pictures	1. Internet basics • Applications and tools - search engine (Internet, URL, Google) - e-mail system (e-group, mailing list • File management - Sharing - Transferring - Converting • Security and maintenance - Troubleshooting - Do's and don'ts - Policies • Survey questionnaire
2. Information management, search and retrieval: • Basic Internet and its application • Electronic avenues (e-mail, instant messaging, discussion forum, search engines, e-groups, file transfer via LAN/CD/flash drives, ftp/pdf)	2. Security, maintenance and antivirus for the users	2. Equipment handling and LAN security • Using/handling digicam (shooting, copying/editing images) • How to secure agency's LAN
	3. File management and sharing + back up and CD burning	3. Communication for development
	4. Internet tools and applications • Search engine • E-mail • File transfer • Sending and converting files	4. Content repackaging and reformatting (technology, agri-inputs, website links)

Training Programmes		
Initial Proposed Training Programmes (18 September 2006)	With FAO Mission (24 November 2006)	Final Training Programmes (28 November 2006)
• Basic troubleshooting (anti-virus, e-copy via CD-ROM, photo management) • Online encoding • Advance PHP/MySQL and web designing	5. Use of VERCON for users and administrators	5. Use of VERCON-Bhutan website
	6. LAN security and maintenance	6. Basic information technology + 5 trainings mentioned above for six Geog extension centres
	7. Communication for development	
3. Content development for extension materials and transformation to farmer-friendly formats	8. Content repackaging and reformatting • Write appropriate content • MMTK content development – writing for the web	
4. How to use the VERCON website		

Annex 48. Budget summary of the final training plan for VERCON-Bhutan

Course	No. of Trainees	Schedule/Duration	Expenses (Nu)			Total Budget (Nu)
			Resource Persons (Honorarium)	Trainees (DSA/DA/TA)*	Other Expenses**	
1. Internet basics	9	December 4-8, 2006 (Mon-Fri)/5 days	25,000	57,600	62,500	145,100
2. Equipment handling and LAN security	11	Within January 2007 (Mon-Fri)/Six (6) days	50,000***	0	5,000	55,000
3. Communication for development	11	Within January 2007/Five (5) days	25,000	57,600	61,500	144,100
4. Content repackaging and reformatting	26	Within February 2007/Five (5) days	25,000	177,600	102,500	305,100
5. Use of VERCON-Bhutan website	35	Within March 2007/Five (5) days in 2 batches	50,000	243,600	163,500	457,100
6. Basic information technology + other trainings mentioned above	18	Within April 2007/Twenty seven (27) days	135,000	747,000	374,000	1,256,000
		TOTAL	**310,000**	**1,283,400**	**769,000**	**2,362,400**

* DSA means daily subsistence allowance; DA means daily allowance while TA means traveling allowance.

** This includes supplies, food, printing/photocopying/binding of manuals/guidelines, and rental for hall, computer, LCD and vehicle.

*** There will be two resource persons, namely: one on equipment handling and another one on LAN security that will conduct training at the Geog pilot sites and Bajo research centre. Follows the honorarium rate of the College of Natural Resources when inviting resource person for training; includes 1 hour lecture and 3 hours preparation.

Title/Venue	Trainer/Other staff	Schedule/Duration	Participants	Equipment Required	Supplies + Vehicle	Budget (Nu)
1. Internet basics/ College of Natural Resources	Trainers: • Mr. Karma Dhendup • Mr. Sangay Tenzin Plus: • 1 Training Coordinator • 1 Support staff	December 4-8, 2006 (Mon-Fri)/5 days	• 9 extension agents	• 10 computers/ CD writers • 3 Flash drives • LCD	• 30 blank CDs • 15 pens • 15 notebooks • Bond papers • Certificates + printing/ photocopying/ binding of manuals	145,100
2. Equipment handling (digicam + 4-in-1 equipment) and LAN security/ Visit to three (3) Geog Centres and RNR RC Bajo	Trainers: • Office Automation representative • Mr. Karma Dhendup • Mr. Sangay Tenzin Plus: • 1 Support staff	Within January 2007 (Mon-Fri)/Six (6) days	• 9 extension agents • 2 RNR RC Bajo researchers handling LAN server and digital camera	• Digital camera • 4-in-1 equipment (fax, printer, photocopier, scanner) • LAN server	• Bond papers + printing/ photocopying/ binding of manuals and/or guidelines	55,000
3. Communication for development/ College of Natural Resources	Trainer: • To be outsourced Plus: • 1 Training Coordinator • 1 Support staff	Within January 2007/Five (5) days	• 9 extension agents • RRCO • Alternate RRCO	• 12 computers • LCD	• 15 pens • 15 notebooks • Bond papers • Certificates + printing/ photocopying/ binding of manuals or guidelines	144,100

Title/Venue	Trainer/Other staff	Schedule/Duration	Participants	Equipment Required	Supplies + Vehicle	Budget (Nu)
4. Content repackaging and reformatting/ College of Natural Resources	Trainers: • To be outsourced Plus: • 1 Training Coordinator • 1 Support staff	Within February 2007/Five (5) days	• 9 extension agents • 5 Bajo Researchers • RRCO • Alternate RRCO • 10 Focal persons*	• 27 computers • 1 LCD	• 30 pens • 30 notebooks • Bond papers • Certificates + printing/ photocopying/ binding of manuals	305,100
5. Use of VERCON-Bhutan website (2 groups)/College of Natural Resources	Trainers: • Mr. Karma Dhendup • Mr. Sangay Tenzin Plus: • 1 Training Coordinator • 1 Support staff	Within March 2007/Five (5) days each group	• 9 extension agents • 5 Bajo Researchers • RRCO • Alternate RRCO • 9 Sector Heads • 10 Focal Persons	• 36 computers • 1 LCD	• 40 pens • 40 notebooks • Bond papers • Certificates + printing/ photocopying/ binding of manuals	457,100
6. Basic Information Technology (IT) + other trainings mentioned above/ College of Natural Resources	Trainers • Mr. Karma Dhendup • Mr. Sangay Tenzin Plus: • 1 Training Coordinator • 1 Support staff	Within April 2007/ Twenty seven (27) days, including 5 days for Basic IT training	• 18 extension agents from 6 Geogs**	• 19 Computers/ CD writers • 3 Flash drives • 1 LCD	• 25 pens • 25 notebooks • Bond papers • Certificates + printing/ photocopying/ binding of manuals	1,256,000
					TOTAL	**2,362,400**

***** One representative each from DSC, NPPC, NSSC, NPHC, AMS, FCB, LIMS, FIMS, CoRRB, and AMC.

** This includes the following Geogs: Trong (Zhemgang Dzongkhag), Darla (Chhukha), Drakten (Trongsa), Bhur (Sarpang), Phongmay (Trashigang), and Chokor (Bumthang). Training on Basic IT which was previously conducted in December 2005 will also be included.

Annex 49. Course schedule and manual for training on Internet basics and troubleshooting (with kind permission from Mr. Karma Dhendup and Mr. Sangay Tenzin)

Attachment 1

Course Schedule – Internet Basics and Troubleshooting
(04-08 December 2006)

Day	**Morning (9:00 AM to 1:00 PM) (Class)**				**Afternoon (2:00 PM to 5:00 PM) (Practice)**		
	(9.00 am – 10.50 am)		**(11.10 am– 1.00 pm)**		**(2.00 pm- 3.20 pm)**		**(3.40 pm-5.00 pm)**
Monday 04/12/2006	**Refresh what was taught in Dec 2005 training on Basic Computer**	**TEA BREAK**	**Internet basics** • Internet • www	**LUNCH BREAK**	Exercise	**TEA BREAK**	Exercise
Tuesday 05/12/2006	**Internet Basics** • Email • E-groups and mailing list		**Internet Basics** • Search Engine		Exercise		Exercise
Wednesday 06/12/2006	**File management** • Managing files • Converting files to different formats		**File backup** • CD burning		Exercise		Exercise
Thursday 07/12/2006	**PC troubleshooting and maintenance** • Best practices and tips		**PC troubleshooting and maintenance .. cont..**		Exercise		Exercise
Friday 08/12/2006	**Antivirus** • Installation • User guide		**…..Wrap-up…..**		Feedback		Certificate distribution

Note
- ❖ Tea Break Duration = 20 Minutes
- ❖ Lunch Break Duration = 1 hour

Manuals prepared by:
- Sangay Tenzin, ICT Officer, ICS-MoA
- Karma Dhendup, CEO, Athang ICTech

Manual:
Training on Internet Basics and Troubleshooting

Contents

What is the Internet? 284
- i. Internet Services 284
- ii. Internet Components 284
- iii. Email 285
- iv. World Wide Web 286
- v. Web Browser 289
- vi. URL 290

Exercises 296

What is the Internet?



The Internet is a network of networks, linking computers to computers. Each runs software to provide or "serve" information and/or to access and view information. The Internet is the transport vehicle for the information stored in files or documents on another computer.

i. Internet Services

E-MAIL - For sending and receiving messages, letters, and attached files via the internet to any internet computer in the world. My favourite application.

WWW - The World Wide Web. Browse web pages containing multimedia (text, graphics and sound)

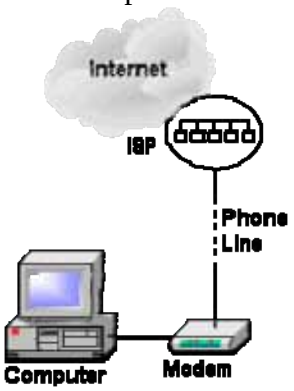
ftp - Used for publishing (up-loading) web pages and multimedia files to the www.

IRC - Internet Relay Chat. A type of bulletin board which shows text as typed, in real time, including yours, of people joined into a chat room at that particular time.

NEWSGROUPS - Bulletin boards where anyone, anywhere, can read and leave messages on any topic.

TELNET - Used for accessing information from other computers and databases. e.g.: Telnet enables your computer a home to emulate a computer in the library you've logged into. You'll see the same screen as if you were in the library at their computer.

Gopher - An early, text-only method for accessing internet documents. Gopher has been almost entirely subsumed in the World Wide Web, but you may still find gopher documents linked to in web pages.



ii. Internet Components

To access the Internet by computer, you need a computer, a modem or other telecommunications link, and software to connect to an Internet Service Provider.

Computer

Serve as the client to access the information in Internet or as a server to store information for other to access.

Medium

A means through which signals can travel as a means for communication. E.g. Phone Line, Cable, DSL, Wireless.

Modem

Short form of modulator/demodulator. A communications device that converts one form of a signal to another that is suitable for transmission over communication circuits, typically from digital to analog and then from analog to digital.

Network Software - TCP/IP

Transmission Control Protocol/Internet Protocol - A collection of protocols that define the basic workings of the features of the Internet.

Application Software - Web Browser

Software programme used to view and interact with various types of Internet resources available on the World Wide Web. Netscape and Internet Explorer are two common examples.

Internet Service Provider (ISP)

ISP, or Internet Service Provider, is a company which provides Internet access for individuals, organizations, and companies usually for a monthly fee.

iii. E-mail

Electronic Mail (e-mail) is a computer-based system for the exchange of messages and other information. Electronic mail is the most common application in use on computer networks allowing rapid and easy communication between individuals and groups.

Components of a mail message

Each mail message includes these fields:

To: This is the e-mail address of the person who is to receive the message.

From: This identifies the person sending the message. It is normally inserted automatically by the sending system.

Subject: This should be a short description of the contents of the mail. Although optional, you should always label your messages this way.

Date: This is automatically included by the system.

You might also use these fields to copy your message to other recipients:

Cc: Use the Cc: field to insert the addresses of people who should receive a copy of a message.

Bcc: Same as Cc:, except the recipients don't see (are blind) that other people are also receiving copies of this message.

These fields form part of the header (like an envelope), which shows the address of the recipient and where the message has come from.

The text of the message (or *body*) follows the mail header.

E-mail addresses (the To: field)

To send a message to someone, the following information is needed:

person: the mail name or username of the other person (the recipient)

site: the mail address of their computer service. This information is usually given as *person@site* e.g. *sangay@yahoo.com*

E-mail etiquettes

When using e-mail, please adopt these simple points of good practice and etiquette.

Remember the laws of the land relating to written communication apply equally to email, including laws on defamation, copyright, obscenity, fraud and discrimination.

Remember that the Internet is an open world - treat the security of email messages you send off-campus about the same as a postcard i.e. anyone along the chain of

distribution might see what you have written. Even for within-campus messages, think carefully before sending sensitive or confidential information by e-mail.

Make a good impression - your email may be seen by persons who don't know you, so ensure that what you write and how you write it gives the reader the right impression.

Be polite - adhere to the same standards as you would when writing a letter. If you TYPE LIKE THIS, for example, people will think you are shouting.

Use humor and sarcasm with care - not everyone will appreciate it and without voice inflection and body language, mail messages can be easily misinterpreted. It sometimes helps to use 'emoticons' such as a smiley face e.g. :-) but use them sparingly.

Don't 'Flame' - Flames are messages or replies that express anger or might anger the reader. Don't get involved in flame wars. Neither post nor respond to incendiary mail.

Keep it simple - e-mail is good for factual information, but not for matters that require tact and diplomacy. People are busy - don't add to their information overload.

Identify yourself - you can use a signature file to put your name at the end of your email automatically (but it's good etiquette to keep it short).

Ensure your email is going to the right destination - it can be easy to use the wrong email address by mistake and your message may be delivered to the wrong person or group. If you do find a message has been misdelivered, send an apology to the person or to the group.

Check your reply settings - it is easy to use "Reply-All" by mistake, and this could be very embarrassing for you and very annoying to others.

Use a meaningful 'subject' field - don't leave it blank; this is very irritating.

Clear out your mailbox regularly - there is limited space in your mailbox. Old mail will be moved aside if you go over quota. Move messages you want to keep into mail folders.

Don't send an attachment unless you need to - attachments, such as Word documents, are much larger than the corresponding text and they can be awkward to handle if the recipient doesn't have the corresponding application. If the formatting is not necessary, insert the text into the body of your e-mail message instead of using an attachment.

Take care with the size of your message - they slow down mail system performance and some Internet mail systems will reject large messages or delay delivery. Large messages are usually caused by including a very large attachment or multiple attachments. A good rule of thumb is to keep the message size below 50KB. Split your attachments across more than one message, if all together they will exceed this size.

When replying to a message, think carefully whether to reproduce the original message in your response - If it's not necessary, don't do it. If you need to refer to it, be selective in the parts that you include in your response.

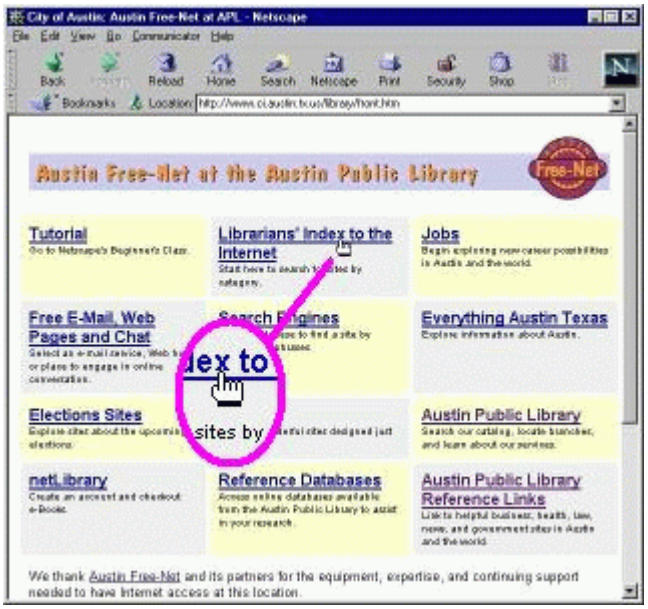
If you need to send mail regularly to a long list of people, create a mailing list - this avoids long lists of recipients at the top of everyone's copy.

Don't send anonymous mail or 'spoof' your address - in 99% of cases, your email can be traced back to its source; disciplinary action may then follow.

Don't 'Spam' - i.e. don't send electronic garbage. Sending junk email, such as advertisements or other unsolicited material, to mailing lists, newsgroups, list servers or to anyone you don't know is considered 'spamming'.

Don't reply to chain-letters - these are an absolute 'no-no' on all networks.

iv. World Wide Web



When you log onto the Internet using a web browser, you are viewing documents on the World Wide Web.

The basic foundation on which the WWW functions is the programming language called ***HTML***. It is HTML and other programming imbedded within HTML that make possible hypertext. Hypertext is the ability to have web pages containing links, which are areas in a page or buttons or graphics on which you can click your mouse button to retrieve another document into your computer. This "clickability" using ***Hypertext*** links is the feature which is unique and revolutionary about the Web.

Hyperlinks

Hyperlinks typically appear as highlighted (underlined and coloured) phrases. The *mouse cursor* will turn to a "pointing finger" when it is pointed over a hyperlink. Click once to follow a hyperlink.

HTML

HyperText Markup Language. It is a programming language to design websites. It defines how the website should be rendered when displayed over the Internet. The Web Browser "interprets" the commands written in the form of HTML and is displayed accordingly.

v. Web Browser

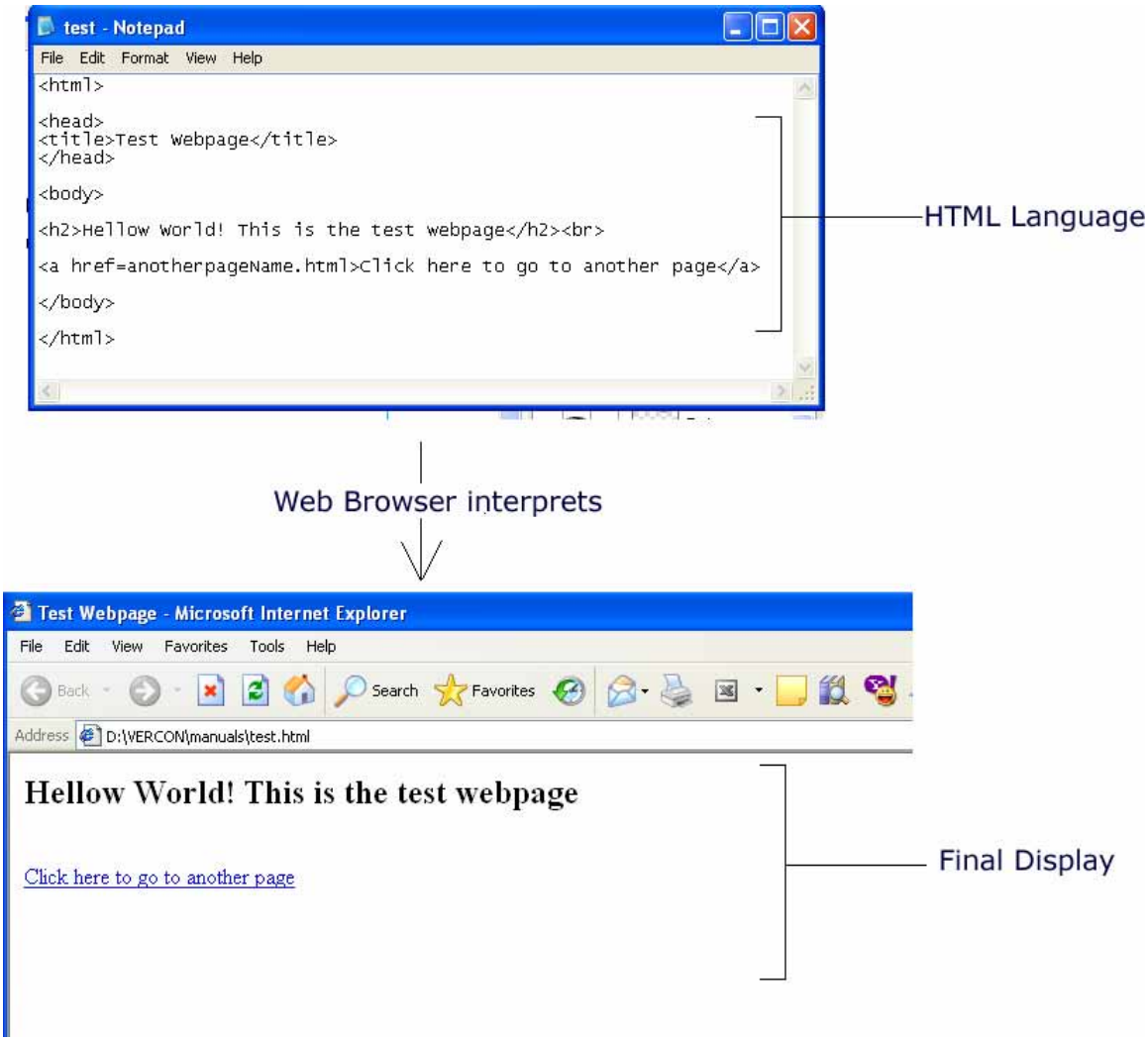
A *web browser* is the computer programme you use to retrieve and view web pages.

The browser "interprets" the programming commands written in **HTML** and finally displays the webpage accordingly. It

Some of the common browsers are:

- MS Internet Explorer
- Netscape
- FireFox
- Opera
- Lynx

Example:



vi. URL

URL stands for Uniform Resource Locator. It defines the location of a file or any resource in the Internet.

A typical URL looks like:

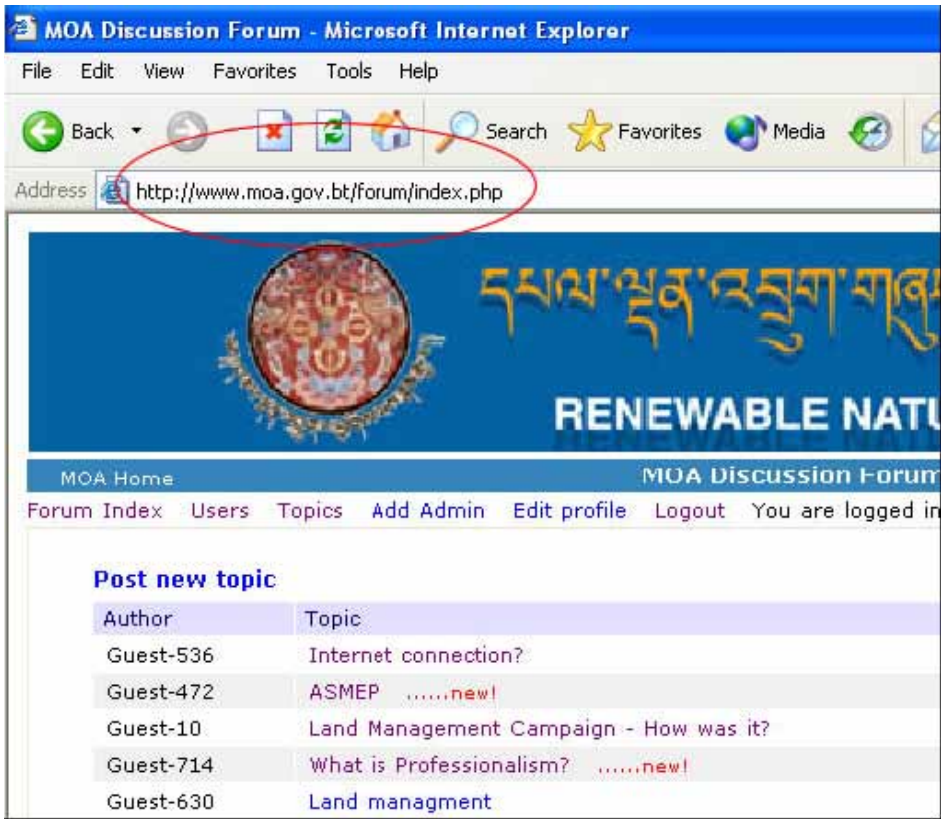
http://www.moa.gov.bt/forum/index.php

http: (hyper text transfer protocol) a set of rules for the web page transfer over the Internet.

www.moa.gov.bt: computer name on the Internet where the required file is located. It is called the domain name.

forum: the folder in which the file is located.

index.php: the required file name.



2. Guide to Critical Thinking about What You See on the Web

Sometimes, it takes special skills just to find something on the Web. To use the Web well, however, you need to do even more. I offer for your consideration the following six suggestions when examining Web pages:

1. *Make sure you are in the right place.*
2. *When in doubt, doubt.*
3. *Consider the source.*
4. *Know what's happening.*
5. *Look at details.*
6. *Distinguish Web pages from pages found on the Web.*

In addition to these six suggestions about evaluating sources, here are some criteria that are commonly used.

- ***Authority:*** Who are the authors of the Web page, or who is responsible for it? What gives them their authority or expertise to write?
- ***Accuracy:*** Do you have good reason to believe that the information on the site is accurate? Are the facts documented?
- ***Objectivity:*** What is the author's point of view? What is the purpose of the site?
- ***Currency:*** When was the information on the page originally written? Has the site been kept up-to-date?
- ***Coverage:*** Does this site address the topic you are researching? Is the information basic and cursory or detailed and scholarly? However complex the language might be is the information substantial?
- ***V***alue: Was the page worth visiting? Does the site offer anything informative, unique, or insightful? Is the site free of careless errors, misspelled words, and poor grammar?

i. Make sure you are in the right place

Ask yourself why you are using the Web. Don't use the Web because it is fun and easy; use it when it is the appropriate source for the information you are seeking. An hour on the Web may not answer a question that you could find within two minutes of picking up a reference book. This is not to say there aren't useful Web sources.

The Web may have been originally designed as a medium to exchange scientific (and military?) research data, but it has become a commercial playground. The research is still there, but it is harder to find and no longer may be free or easily accessible.

Not everything is on the Web. Let me repeat. Not everything is on the Web. Because of copyright, cost, and demand issues (and dozens of other reasons), some materials just won't be found on the Web. Although some really old stuff does show up on the Web in new packages, most materials written before you were born have not migrated to the Web and probably never will. As for more recent stuff, the issue is evolving. Much more is available online than just a few years ago. However, what is available and what is freely available are two different issues.

Questions to think about:

Does this site address the topic you are researching? Was the page worth visiting?

ii. When in doubt, doubt

Almost anyone can put up almost anything on the Web for almost any purpose. Look for ambiguity, manipulative reasoning, and bias. Examine assumptions, including and perhaps especially, your own.

Accuracy is not easy to confirm. Information on a site cannot be evaluated unless you compare it to other sources. As with any research, you must test one source against another. Unfortunately, sometimes facts can be misleading.

Who coined the phrase Question Authority!? Look at five or six different Web sites and you might get six or eight different answers.

- Many Web pages credit the bumpersticker, but Hippieland Glossary also indicates it's from the sixties. Or is it from the '70s or more recent?
- Several sites attribute the quote to Timothy Leary. However, Web page with the claim that Timothy Leary was a CIA agent indicates that Dr. Leary was quoting Socrates. Perhaps it's a bumper sticker summation of Socrates' idea.
- Some pages insist or at least hint at a Unitarian-Universalist connection.
- To complete the circle, I suspect this page has been used as an authority to answer the question.

My advice: question the authority of all Web sources. Don't accept an author's word without checking for supportive evidence. Look for such things as bibliographic citations or links to resources.

Questions to think about:

Do you have good reason to believe that the information on the site is accurate? Do authors provide any supportive evidence for their conclusions?

iii. Consider the source

Try to find out who wrote or created the Web pages -- not just their names, but something that indicates what about them indicates they are a "good source." It is easy to think that an author wouldn’t be writing unless he or she was some kind of expert on the topic, but that is not always true.

Consider this report on the Bay of Pigs by Jared Wiener. A Google search reveals it has been linked by more than a hundred Web sites. But who is Jared Weiner? Historian? Congressional investigator? Senior news analyst? The site doesn't say, but he is a student at Ithaca College who is a talented double major and news director for an award-winning news programme at ICTV. However, he wrote the report when he was in the eighth

grade. He may not be a renowned Kennedy era scholar, but, he tells me, he did get an A- on the report.

Sometimes pages will generously provide an about the author link, but usually you will have to dig around.

You can try googling an author, but you can also check the URL itself for important clues. Truncating the URL by deleting the all the characters after each slash (/) until you get to the first one is a good way to find out what person, organization, or institution is responsible for the site. The URL http://www.ithaca.edu/library/training/think3.html reveals that this page is connected to the Library at Ithaca College.

The distinctions among the codes have blurred, and even more letters have been added, but check the top level domain of the site's URL. That's the .com, .org, .gov, .edu, and two letter geographic codes, among others. A tilde (~) is becoming rare in a URL, but it used to be a strong indication of a personal homepage. Now most personal web pages will have a .com address. Whether a .com is a personal web page or a commercial site, it warrants a different kind of scrutiny than a .gov page, one sanctioned by the US government. The quality and nature of .edu sites range from research forums to joke collections, so just knowing the organization responsible for a web site is not enough.

Questions to think about:

Who is responsible for the site? Do the authors have any authority or expertise? Do they provide you a means to contact them? Is this a commercial, governmental, personal, or academic Web site?

iv. Know what's happening

Try to identify the reason the Web page was created in the first place. Determine if the main purpose is to inform, to persuade, or to sell you something. Advertising and opinion can both be disguised. If you know the motive behind the page's creation, you can better judge its content. And here is an important, if difficult, question to ask: What is not being said?

Since money talks, try to notice who is paying for the site, either through advertising or sponsorship. Both can affect content and objectivity. Whether bias is intentional or not, it is a factor. For example, facts presented by the National Rifle Association concerning gun control legislation are more likely to be challenged by others than its facts on gun safety.

Try to determine who the site is intended for. Simplification of facts can distort them, but if the information is too technical or jargon-ridden, you may have a hard time understanding it.

Whatever the type it is, if a Web site is presenting facts or statistics, quoting a person or a passage, there should be documentation. A citation or a link should be provided. If there is no documentation, you shouldn't use the cite for research. Your next step will then be to check out the sources and test the authors' conclusions, as you would for any other research material.

Questions to think about:

What is the purpose of the site? Is the main purpose to inform, to persuade, or to sell you something? Do you understand what is being said? Are the facts documented? What do you think has not been said that should be addressed?

v. Look at details

Internal clues can tell you much about a Web page. Check for the obvious things, such as good grammar and correct spelling. Note the depth of the material presented. Is the language simple or technical and demanding? Look for documentation of the facts being presented. Look for the date the page was last revised.

Graphics may help a Web page look more interesting, but do they serve any purpose other than decoration? Just as a magazine with many colour advertisements may have a different purpose than a scholarly journal with no illustrations, a Web site with mirthful colour and slickness may not be primarily a research site. However, even academic types can get carried away with cool icons.

Pay attention both to how well the links work and what kind of sources are being linked. In addition, check to see who has links to the page and what they have to say about it.

The WayBackMachine at the Internet Archive can show you how a web page has evolved and changed over the years. Sometimes by comparing the revisions you gain some clues about the nature of the site. The archive can also help you locate sites that have disappeared, if you know the original URL.

Questions to think about:

Is the site well organized? Are there misspelled words or examples of poor grammar? Do the links work? Do they send you beyond the site to other reliable sources of information? Does the site offer anything unique or does it tell you little more than you could find in an encyclopedia? Are the graphics on the page clear and helpful or distracting and confusing? What opinions do others have about the Web page?

vi. Distinguish Web pages from pages found on the Web

When people speak of Web pages, they usually don't mean books and periodical articles, but both books and periodical articles are accessible through the Web.

Publishing is changing, and some research materials may only be available online. Government agencies have led the way in the online migration of documents.

Many libraries no longer subscribe to the paper version of some periodicals, but either subscribe to the online version of the journal or rely on full text access through Web-based periodical databases.

The online version of a periodical article is no more or less reliable than the same article found in the print version of the journal. On the Web, however, you can't see a periodical's glossy, lurid cover, or lack of one, so it can take more effort to distinguish among magazines, trade journals, and peer reviewed journals. Wherever you find it, in print or online, a source must be considered and evaluated before you use it for research.

Questions to think about:

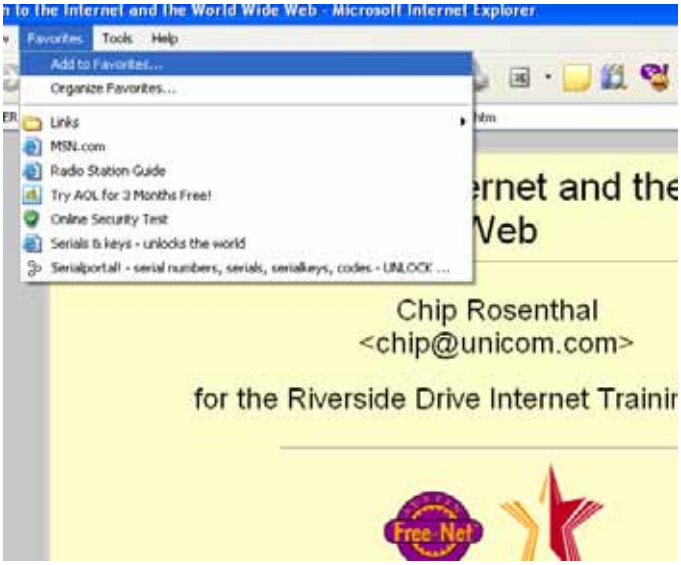
Do you think this page was designed for the Web, or do you think it was originally something else? If it was originally something else, what something else was it?

Exercises:

1. Visit any website using the Internet Explorer and identify the URL.

2. Add the website that you have accessed to "Favorites" list.
Sometimes you may find a website which you would like to revisit later but the URL is difficult to remember. You can add that website link to "Favorites" list using the Internet Explorer so that later you can access the website without having to remember the URL.

Steps
1. Open the website that you would like to add to favorites list.
2. Go to -> Add to Favorites…



3. The “title” of the webpage will be saved as the default name of the site. However, this name can be changed as required.



Practice: Add more links to the favorites list and save the links in different folders.

3. Set the Internet Explorer default page to www.moa.gov.bt

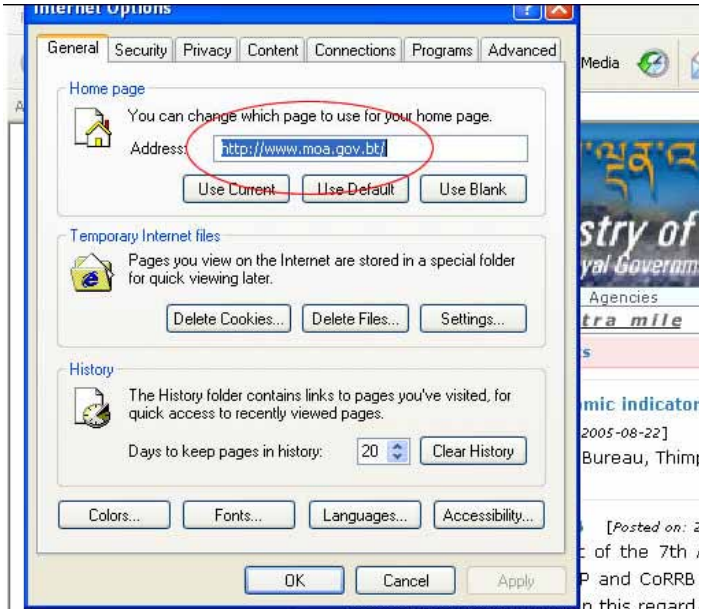
Setting the default page to your Internet Explorer will let you define the page to be opened when you click the Internet Explorer. E.g. if you set your Default Page as www.moa.gov.bt, the MoA website will appear when you click the Internet Explorer.

Steps

1. Open the Internet Explorer.
2. Click on the Tools menu and choose Internet Options…



3. Enter the desired home page URL into the following address box:



4. Click OK.

Now if you click on the Internet Explorer, your default page will appear whose address you entered into the address dialog box above.

If you chose “Use blank” option in the address dialog box, a blank page will be set as your default page.

4. Clearing History List in Internet Explorer

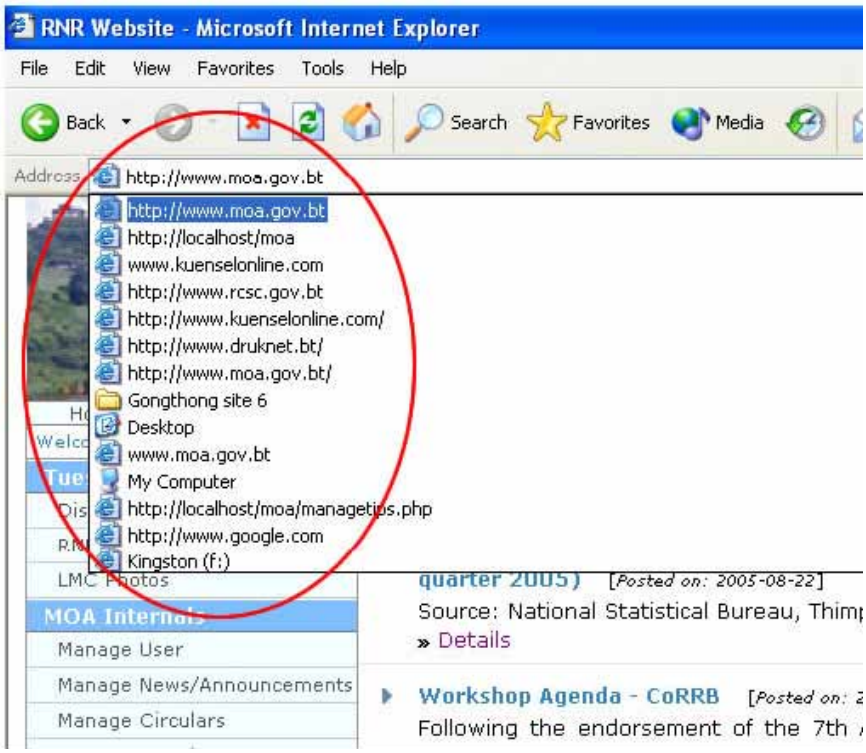
The Internet Explorer keeps track of the websites you visited in its "History list". You can see the history list in the drop down menu on the address bar of the Internet Explorer.

E.g.:

You probably do not want to keep the list because, say, you do not want somebody to know what websites you visited. How can you clear this list?

Steps:

1. Open the Internet Explorer.
2. Go to the Tools menu and select Internet Options…

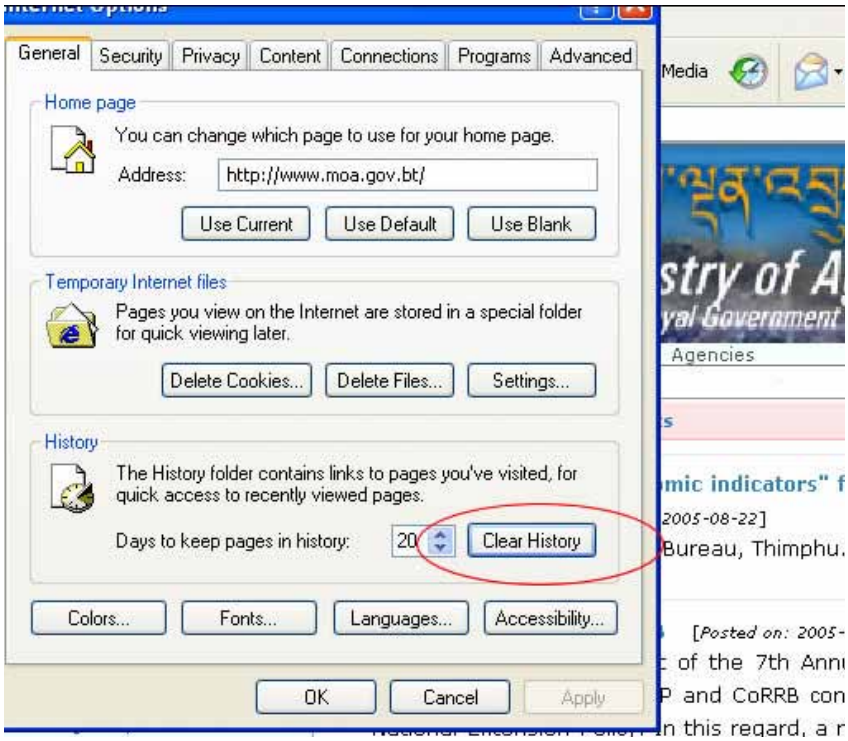


Steps:

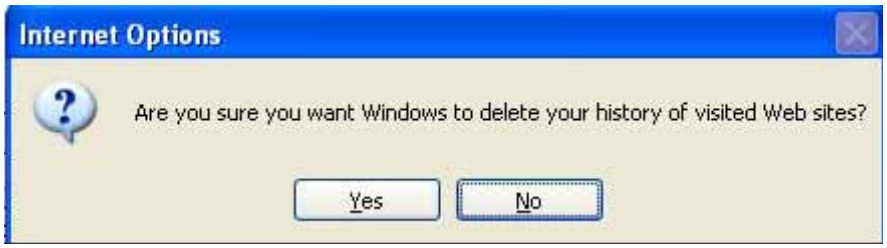
1. Open the Internet Explorer.
2. Go to the Tools menu and select Internet Options…



3. Click on the Clear History button.



4. Click Yes when the following appears:



Now checked the address bar of the Internet. There won't be any URLs in the History list.

5. Create an email account using any of the following email servers:

- www.yahoo.com
- www.hotmail.com
- www.gmail.com

6. Send an email message to someone. If possible check whether the recipient has received the email or not.

7. Send an email message with file attachment.

Contents

1. What is Search Engine 303
2. Major Search Engines 303
3. Google Search Engine (www.google.com) 303
    i. Introduction 303
    ii. Result Page 304
    iii. Google Search Features 307
    iv. Search Tips 318
Exercises 320

1. What is Search Engine

Search Engines are programmes which help users find web pages on a given subject. The search engines maintain databases of web sites and use programmes (often referred to as "spiders" or "robots") to collect information, which is then indexed by the search engine.

2. Major Search Engines

1. Google http://www.google.com
2. Yahoo http://www.yahoo.com
3. Ask Jeeves http://www.askjeeves.com
4. AllTheWeb.com http://www.alltheweb.com
5. AOL Search http://search.aol.com/
6. HotBot http://www.hotbot.com
7. Teoma http://www.teoma.com
8. AltaVista http://www.altavista.com
9. Gigablast http://www.gigablast.com
10. LookSmart http://www.looksmart.com
11. Lycos http://www.lycos.com
12. MSN Search http://search.msn.com
13. Netscape Search http://search.netscape.com
14. Open Directory http://dmoz.org/

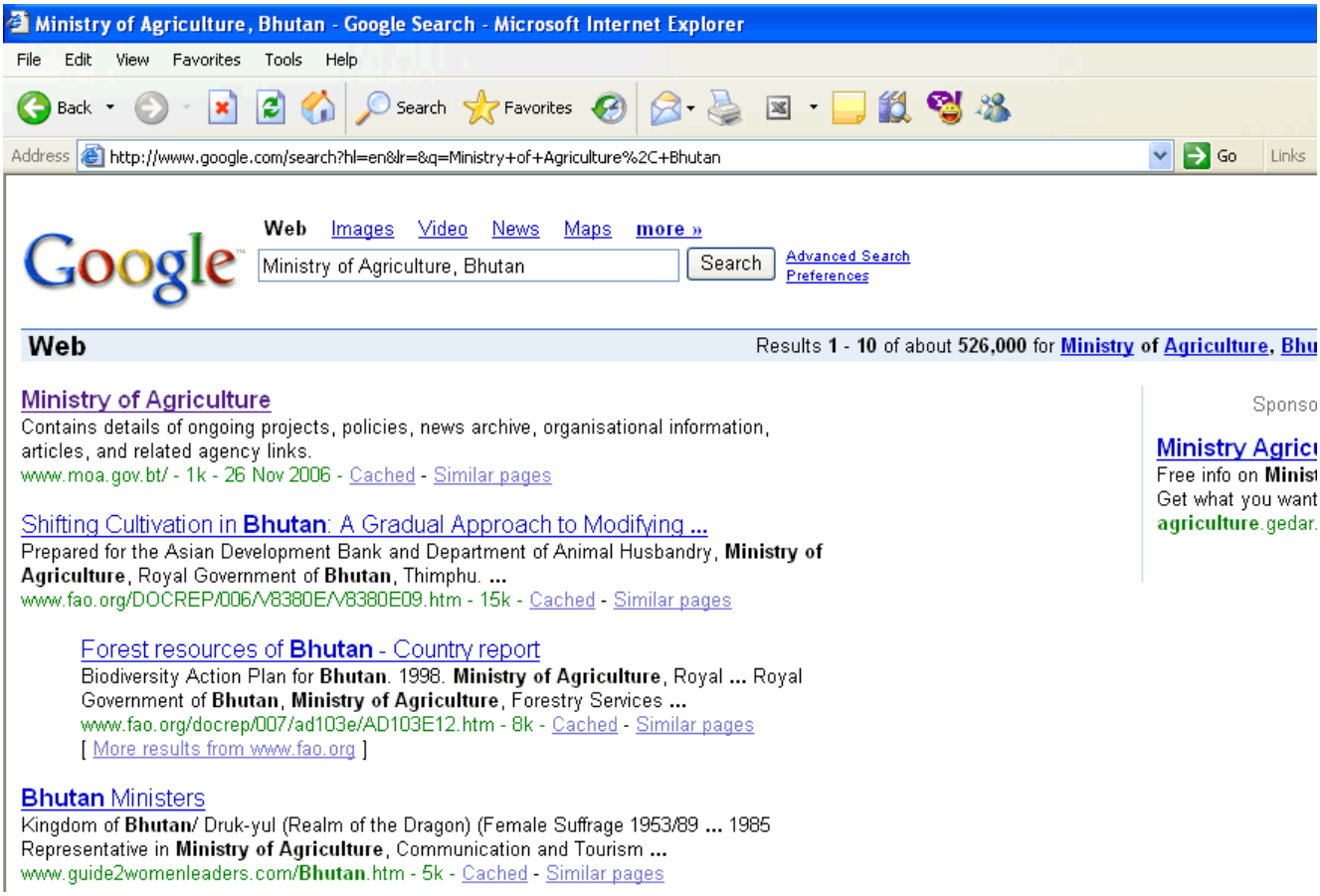
3. Google Search Engine (www.google.com)

i. Introduction

Google is one of the most popular search engines used.

Doing a search on Google is easy. Simply type one or more search terms (the words or phrase that best describe the information you want to find) into the search box and hit the 'Enter' key or click on the Google Search button.

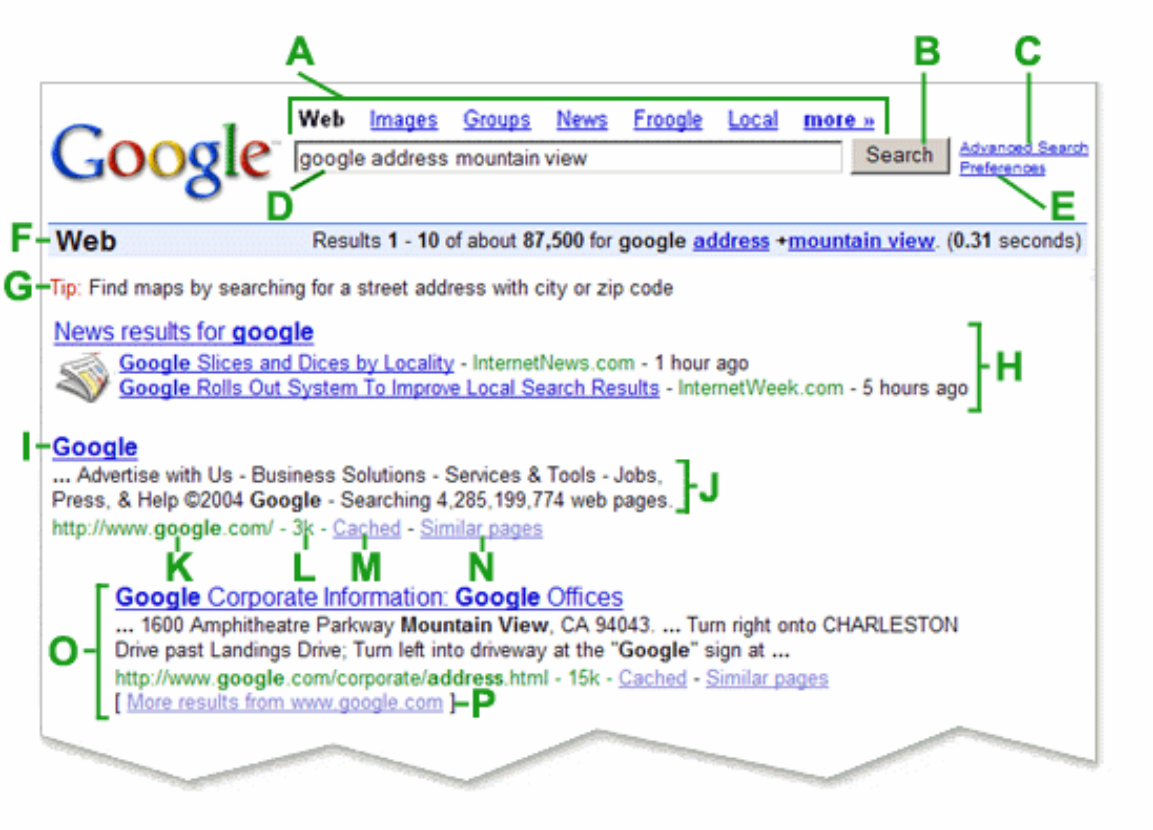
Example, type “Ministry of Agriculture, Bhutan” into the search box and enter. The following page will load:



ii. Result Page

Your search results page is packed with information. Here's a quick guide to decoding it.

Each underlined item is a search result that the Google search engine found for your search terms. The first item is the most relevant match we found, the second is the next-most relevant, and so on down the list. Clicking on any underlined item will take you to the associated web page. But first, here's a sample search results page, along with brief explanations of the various types of information about your search results that you can find there.



A. Top links

Click the link for the Google service you want to use. You can search the web, look for images, browse Google Groups (Usenet discussion archive), or use Froogle to search for products.

B. Google search button

Click on this button to submit another search query. You can also submit your query by hitting the 'Enter' key.

C. Advanced search

This links to a page on which you can do more precise searches.

D. Search field

To do a search on Google, just type in a few descriptive search terms, then hit “Enter”, or click on the “Google Search” button.

E. Preferences

This links to a page that lets you set your personal search preferences, including your language, the number of results per page, and whether you want your search results screened by our SafeSearch filter to avoid seeing adult material.

F. Statistics bar

This line describes your search and indicates the total number of results, as well as how long the search took to complete.

G. Tip

Information that helps you search more efficiently and effectively by pointing out Google features and tools that might improve the query you just made.

H. OneBox results

Google's search technology finds many sources of specialized information. Those that are most relevant to your search are included at the top of your search results. Typical onebox results include news, stock quotes, weather and local websites related to your search.

I. Page title

The first line of any search result item is the title of the web page we found. If you see a URL instead of a title, then either the page has no title or we haven't yet indexed that page's full content, but its place in our index still tells us that it's a good match for your query.

J. Text below the title

This is an excerpt from the result page with your query terms are bolded. If we expanded the range of your search using stemming technology, the variations of your search terms that we searched for will also be bolded.

K. URL of result

This is the web address of the returned result.

L. Size

This number is the size of the text portion of the web page, and gives you some idea of how quickly it might display. You won't see a size figure for sites that we haven't yet indexed.

M. Cached

Clicking this link will show you the contents of the web page when we last indexed it. If for some reason the site link doesn't connect you to the current page, you might still find the information you need on the cached version.

N. Similar pages

When you select the Similar Pages link for a particular result, Google automatically scouts the Web for pages that are related to this result.

O. Indented result

When Google finds multiple results from the same website, the most relevant result is listed first, with other relevant pages from that site indented below it.

P. More results

If we find more than two results from the same site, the remaining results can be accessed by clicking on the "More results from..." link.

iii. Google Search Features

In addition to providing easy access to billions of web pages, Google has many special features to help you to find exactly what you're looking for. Click the title of a specific feature to learn more about it.

• Book Search	Use Google to search the full text of books.
• Cached Links	View a snapshot of each page as it looked when we indexed it.
• Calculator	Use Google to evaluate mathematical expressions.
• Currency Conversion	Easily perform any currency conversion.
• Definitions	Use Google to get glossary definitions gathered from various online sources.
• File Types	Search for non-HTML file formats including PDF documents

	and others.
• Froogle	To find a product for sale online, use Froogle - Google's product search service.
• Groups	See relevant postings from Google Groups in your regular web search results.
• I'm Feeling Lucky	Bypass our results and go to the first web page returned for your query.
• Images	See relevant images in your regular web search results.
• Local Search	Search for local businesses and services in the U.S., the U.K., and Canada.
• Movies	Use Google to find reviews and show times for movies playing near you.
• Music Search	Use Google to get quick access to a wide range of music information.
• News Headlines	Enhances your search results with the latest related news stories.
• PhoneBook	Look up U.S. street address and phone number information.
• Q&A	Use Google to get quick answers to straightforward questions.
• Refine Your Search	Add instant info and topic-specific links to your search in order to focus and improve your results.
• Results Prefetching	Makes searching in Firefox faster.
• Similar Pages	Display pages that are related to a particular result.
• Site Search	Restrict your search to a specific site.
• Spell Checker	Offers alternative spelling for queries.
• Street Maps	Use Google to find U.S. street maps.
• Travel Information	Check the status of an airline flight in the U.S. or view airport delays and weather conditions.
• Weather	Check the current weather conditions and forecast for any location in the U.S.
• Web Page Translation	Provides you access to web pages in other languages.
• Who Links To You?	Find pages that point to a specific URL.

Book Search

Google is helping to get the world's information online by bringing books themselves online. Whenever books in our Google Book Search index contain content that matches your search terms, you'll see links to those books under Book Results at the top of your search results page. Click on any book title and you'll see the page in that book which contains your search terms, as well as other information about the title. Click one of the links under "Buy this Book" and you'll go straight to a bookstore selling that book online.

example: books about Agriculture [Google Search]

Cached Links

Google takes a snapshot of each page examined as it crawls the web and caches these as a back-up in case the original page is unavailable. If you click on the "Cached" link, you will see the

web page as it looked when we indexed it. The cached content is the content Google uses to judge whether this page is a relevant match for your query.

When the cached page is displayed, it will have a header at the top which serves as a reminder that this is not necessarily the most recent version of the page. Terms that match your query are highlighted on the cached version to make it easier for you to see why your page is relevant.

The "Cached" link will be missing for sites that have not been indexed, as well as for sites whose owners have requested we not cache their content.

Google
... Advertise with Us - Business Solutions - Services & Tools - Jobs,
Press, & Help ©2004 **Google** - Searching 4,285,199,774 web pages.
www.**google**.com/ - 3k - Nov 26, 2004 - » Cached « - Similar pages

Calculator

To use Google's built-in calculator function, simply enter the calculation you'd like done into the search box and hit the Enter key or click on the Google Search button. The calculator can solve math problems involving basic arithmetic, more complicated math, units of measure and conversions, and physical constants. Try one of the sample expressions below, or refer to our complete instructions for help in building your own.

These sample queries demonstrate the utility and power of this new feature:

- 5+2*2
- 2^20
- sqrt(-4)
- half a cup in teaspoons
- 160 pounds * 4000 feet in Calories

example: 5+2*2 [Google Search]

Currency Conversion

To use our built-in currency converter, simply enter the conversion you'd like done into the Google search box and hit "Enter" or click the Google Search button

Here are some sample queries:

- 3.5 USD in GBP
- currency of Brazil in Malaysian money
- 5 British pounds in South Korean money
- 2.2 USD per gallon in INR per litre

example: 

Definitions

To see a definition for a word or phrase, simply type the word "define," then a space, and then the word(s) you want defined. If Google has seen a definition for the word or phrase on the Web, it will retrieve that information and display it at the top of your search results.

example : 

You can also get a list of definitions by including the special operator "define:" with no space between it and the term you want defined. For example, the search [define:World Wide Web] will show you a list of definitions for "World Wide Web" gathered from various online sources.

File Types

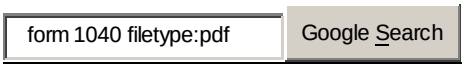
Google has expanded the number of non-HTML file types searched to 12 file formats. In addition to PDF documents, Google now searches Microsoft Office, PostScript, Corel WordPerfect, Lotus 1-2-3, and others. The new file types will simply appear in Google search results whenever they are relevant to the user query.

Google also offers the user the ability to "View as HTML", allowing users to examine the contents of these file formats even if the corresponding application is not installed. The "View as HTML" option also allows users to avoid viruses which are sometimes carried in certain file formats.

Overall, the additional file types provide Google users a wider view of the content available on the World Wide Web. And Google has plans to keep expanding the range of file types available over time.

» **[PDF]** « The Anatomy of a Search Engine File Format: PDF/Adobe Acrobat - » View as HTML «**...** Second, **Google** keeps track of some visual presentation details such as font**...** phonenumbers, product numbers), type or format (text, HTML, **PDF**, images, sounds**...** www-db.stanford.edu/pub/papers/google.pdf - Similar pages

If you prefer to see a particular set of results with a specific file type (for example, PDF links), simply type **filetype:[extension]** (for example, **filetype:pdf**) within the search box along with your search term(s).

example: 

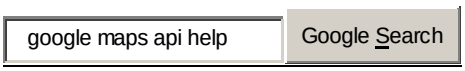
Froogle

If you search for products using Google, you may see relevant product search information and links displayed at the top of your search results. These product search results are linked to the sites of merchants who participate in Froogle, Google's product search service. These results are not advertisements, as participation in Froogle is completely free to merchants.

example: 

Groups

When you search on Google, sometimes you'll see results from Google Groups at the bottom of your search results page. These are messages that users have posted to a discussion group about a topic related to your search. Clicking on one of these results will bring you to the full text of the message on the Google Groups site.

example: 

I'm Feeling Lucky

The "I'm Feeling Lucky™" button takes you directly to the first web page Google returned for your query. You will not see the other search results at all. An "I'm Feeling Lucky" search means you spend less time searching for web pages and more time looking at them.

For example, to find the homepage for Stanford University, simply enter Stanford into the search field and click on the "I'm Feeling Lucky" button. Google takes you directly to "www.stanford.edu", the official homepage of Stanford University.

example: 

Images

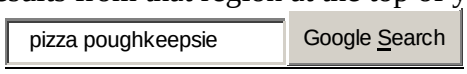
You may occasionally see small images at the top of your Google search results. These are images that we think are relevant to your search terms.

You can also find relevant images by doing a Google Image Search, or by adding words like 'pics' or 'pictures' to your search terms when you do a regular web search.

example: 

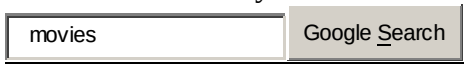
Local Search

Google Local enables you to search the entire web for just those stores and businesses in a specific neighborhood. Include a city or zip code in your search and Google displays relevant results from that region at the top of your search results.

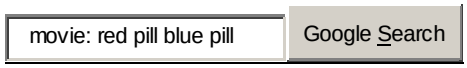
example: 

Movies

To find reviews and show times for movies playing near you, type "movies", "show times" or the name of a current film into the Google search box. If you've already saved your location by using Google Local, the top search result will display show times for nearby theaters for the movie you've chosen.

example: 

Can't remember a movie title, or just looking for something new to see? You can use the "movie:" operator to search for films related to a specific actor, director or plot detail.

example: 

Want to read about the movies you find? Your search results for any film will include an average rating out of 5 stars and several snippets from online reviews, along with links to the reviews themselves. Click the "reviews" link near any title for a complete list of online reviews of this film.

Music Search

Find information about artists, songs, albums and places to buy the music you are looking for. If you enter the name of an artist popular in the U.S. into the search box, we will display user reviews, song titles, stores to purchase the music and other useful information related to that artist at the top of your search results.

Click on the link to see more music information about that artist such as related albums, songs, and more.

News Headlines

When searching on Google you may see links at the top of your results marked "News". These links connect you to reports culled from numerous news services Google continuously monitors. The links appear if the terms you enter are words currently in the news and clicking on them will take you directly to the service supplying them.

example: 

PhoneBook

Google has added the convenience of US street address and phone number lookup to the information we provide through our search box. You'll see publicly listed phone numbers and addresses at the top of results pages for searches that contain specific kinds of keywords.

To find listings for a **US residence**, type any of the following combinations into the Google search box:

- first name (or first initial), last name, city (state is optional)
- first name (or first initial), last name, state
- first name (or first initial), last name, area code
- first name (or first initial), last name, zip code
- phone number, including area code
- last name, city, state
- last name, zip code

Q&A

Want to know the population of Japan? What currency is used in Algeria? The birthplace of Bono? Hit us with a fact-based question or query (like "population of Japan") by typing it into the Google search box. We'll search the web and display the answer at the top of your search results page. We also link to our source for this information so that you can learn even more.

example: 

Refine Your Search

For searches within certain topics, you'll notice links at the top of the search results page that help you quickly narrow your search.



These links are labels that have been assigned to certain WebPages. Organisations, businesses, and individuals can label websites in the topics they know best.

example: 

Results Prefetching

On some searches, Google automatically instructs your browser to start downloading the top search result before you click on it. If you click on top result, the destination page will load faster than before.

Google uses a special prefetching feature in Firefox and Mozilla web browsers to provide this functionality, so results prefetching is not available in Internet Explorer or other web browsers.

Similar Pages

When you click on the "Similar Pages" link for a search result, Google automatically scouts the web for pages that are related to this result.

The Similar Pages feature can be used for many purposes. If you like a particular site's content, but wish it had more to say, Similar Pages can find sites with similar content with which you may be unfamiliar. If you are looking for product information, Similar Pages can find competitive information so you can make direct comparisons. If you are interested in researching a particular field, Similar Pages can help you find a large number of resources very quickly, without having to worry about selecting the right keywords.

The more specialized a page is, the fewer results Google will be able to find for you. For example, Similar Pages may not be able to find related pages for your personal home page if it does not have enough information to authoritatively associate other pages with yours. Also, if companies use multiple URLs for their pages (such as company.com and www.company.com), Similar Pages may have little information on one URL, but lots on the other. In general, however, Similar Pages works well for the majority of web pages.

Google
... Advertise with Us - Business Solutions - Services & Tools - Jobs,
Press, & Help ©2004 **Google** - Searching 4,285,199,774 web pages.
www.**google**.com/ - 3k - Mar 26, 2004 - Cached - **»** Similar pages **«**

Site Search

The word "site" followed by a colon enables you to restrict your search to a specific site. To do this, use the **site:sampledomain.com** syntax in the Google search box. For example, to find admission information on Stanford's site, enter:

example: admission site:www.stanford.edu [Google Search]

Spell Checker

Google's spell checking software automatically looks at your query and checks to see if you are using the most common version of a word's spelling. If it calculates that you're likely to generate more relevant search results with an alternative spelling, it will ask "Did you mean: (more common spelling)?". Clicking on the suggested spelling will launch a Google search for that term. Because Google's spell check is based on occurrences of all words on the Internet, it is able to suggest common spellings for proper nouns (names and places) that might not appear in a standard spell check programme or dictionary.

Street Maps

To use Google to find street maps, enter a U.S. street address, including zip code or city/ state (e.g. 165 University Ave Palo Alto CA), in the Google search box. Often, the street address and city name will be enough.

example: 

When Google recognises your query as a map request, we'll return links from Google Maps and other high quality map providers that will lead you directly to the relevant map.

Travel Information

To see delays and weather conditions at a particular airport, type the airport's three letter code followed by the word "airport." For example, San Francisco International Airport updates can be found by searching for "sfo airport."

example: 

To check the status of a U.S. flight, type the name of the airline followed by the flight number. For example, to see the status for United Airlines flight 134 search for "United 134."

example: 

Weather

To see weather conditions and a four-day forecast for a particular U.S. location, type "weather," followed by the location. Usually a city name will be enough, but you may also want to include a state or zip code. For example, to see Palo Alto weather, you could search for "weather palo alto, ca" or "weather palo alto 94301."

example: 

Web Page Translation

Google breaks the language barrier with this translation feature. Using machine translation technology, Google now gives you the ability to access web pages in languages other than your own. Currently, Google offers the following translation pairs: English to and from Arabic, Chinese, French, German, Italian, Korean, Japanese, Spanish, and Portuguese; and German to and from French.

If your search results contain a page in one of these languages, and we support your translation pair, you can translate that page into your language with a single click.

Répertoire Web de **Google** - World > Français - » [Translate this page] «
... Modifié par **Google** - ©2003 **Google** Aide du répertoire **Google** - À propos - **Google** in English.
directory.**google**.com/Top/World/ - 7k - Mar 26, 2004 - Cached - Similar pages

Who Links To You?

Some words, when followed by a colon, have special meanings to Google. One such word for Google is the **link:** operator. The query **link:siteURL** shows you pages that point to that URL. For example, link:www.google.com will show you pages that point to Google's home page. You cannot combine a link: search with a regular keyword search.

example: 

iv. Search Tips

Here are some basic tips to help you maximize the effectiveness of your search:

Choosing search terms

Choosing the right search terms is the key to finding the information you need.

Start with the obvious – if you're looking for general information on Hawaii, try ***Hawaii***.

But it's often advisable to use multiple search terms; if you're planning a Hawaiian vacation, you'll do better with ***vacation Hawaii*** than with either ***vacation*** or ***Hawaii*** by themselves. And ***vacation Hawaii golf*** may produce even better (or, depending on your perspective, worse) results.



Capitalization

Google searches are **NOT** case sensitive. All letters, regardless of how you type them, will be understood as lower case. For example, searches for ***george washington***, ***George Washington***, and ***gEoRgE wAsHiNgToN*** will all return the same results.

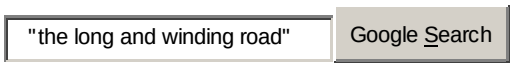
Automatic "and" queries

By default, Google only returns pages that include all of your search terms. There is no need to include "and" between terms. Keep in mind that the order in which the terms are typed will affect the search results. To restrict a search further, just include more terms. For example, to plan a vacation to Hawaii, simply type ***vacation hawaii***.



Phrase searches

Sometimes you'll only want results that include an exact phrase. In this case, simply put quotation marks around your search terms.



Phrase searches are particularly effective if you're searching for proper names (***"George Washington"***), lyrics (***"the long and winding road"***), or other famous phrases (***"This was their finest hour"***).

Negative terms

If your search term has more than one meaning (***bass***, for example, could refer to fishing or music) you can focus your search by putting a minus sign ("-") in front of words related to the meaning you want to avoid.

For example, here's how you'd find pages about bass-heavy lakes, but not bass-heavy music:



Note: when you include a negative term in your search, be sure to include a space before the minus sign.

+ and – qualifiers

If you prepend a word with **+** that word is required to be on the page.

If you prepend a word with **-** that word is required to *not* be on the page.

Example: +always -never

**** wildcard***

If a query word ends with a ***** all words on a page which start the same way as that query word will match.

Example: gift*

? wildcard

If a query word contains a **?** any character will match that position.

Example: b?g

boolean search

You can use the following boolean operators in your search: AND, OR, NOT. These operators MUST be in capital letters.

Example: (contact AND us) OR (about AND us)

Exercises:

1. Explore different Search Engines.
2. Search the information in Google with using the keyword **Ministry of Agriculture, Bhutan.** Open another Google page and search the information using the keyword **"Ministry of Agriculture, Bhutan",** and note the difference in the two result pages.
3. Find the definition of **Agriculture** using Google.
4. Carry out basic arithmetic calculations using Google.
5. Search images of **Yak** using Google.
6. Find the answer to the question "**Altitude of Bhutan**" using Google.
7. Find the weather information about Thimphu using Google.