



# KVK TAWANG

## Newsletter



Annual Newsletter of Krishi Vigyan Kendra, Tawang  
Deptt. of Agriculture, Govt. of Arunachal Pradesh

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### Editor's Desk



I am immensely pleased to put forth the fourth issue of newsletter readers which chronicles the achievements of Krishi Vigyan Kendra, Tawang, Arunachal Pradesh. This issue will specially be highlighting on the significant achievements of activities and events conducted by our institute and also total numbers of farmers benefited from this programme. I hope you enjoy reading the current issue of Krishi Vigyan Kendra, Tawang Newsletter.

Your constructive criticism will certainly guide us.

(D. S. Chhonkar)  
Programme Coordinator

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# ARUNACHAL REVIEW

[www.arunachalpr.gov.in](http://www.arunachalpr.gov.in)

WANG FESTIVAL 2017



## Scientific Cultivation Technology of Oyster Mushroom in Arunachal Pradesh

C.K.Singh, SMS (Agronomy)  
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(Arunachal Pradesh)



**D**iversification in any farming system imparts sustainability. Mushrooms are one such component that not only impart diversification but also help in addressing the problems of health, food, health and environmental related issues. One of the major areas that can contribute towards goal of conservation of natural resources is increased productivity & recycling of agro-wastes including agro-residue waste. Utilizing these wastes for growing mushroom can enhance income without higher level of investment.

Commercial production of mushrooms has been the agricultural, in-

dustrial forestry and household wastes into nutritious food (mushroom). Indoor cultivation of mushroom utilize the vertical space and is regarded as the highest protein producer per unite area and time-almost 100 times more than the conventional agriculture and animal husbandry.

The oyster mushroom is one of the most suitable fungal organisms for producing protein rich food from various agro wastes without composting.

**Nutritional and Medicinal Value of Oyster Mushroom-**

1. The mushroom are rich in protein, dietary fibre, vitamins and minerals.
2. The low calorific

yield from mushroom foods.

3. The mushroom do not have cholesterol, instead they have ergo sterol that acts as a precursor for vitamin D synthesis in human body.

4. Maintain the level of blood sugar.

5. Vita.D helps to replicate the healthy cells and protect the autoimmune conditions such as flu and common cold.

5. Besides the balance of triglycerides and cholesterol levels, Vita.B3 helps to reduce atherosclerosis that the hardening of arteries which may lead to heart disease.

7. The copper has an impact on the brain pathways such as galctose and dopamine which help to maintain the energy, mood, focus and outlook.

8. An adequate amount of oxygen in blood, low red blood cell production and the blood loss are the causes of Anemia, Vita.B2 help to prevent the anemia.

9. Vitamin B converts the carbohydrates into glucose which is used as a fuel to produce energy.

10. Vitamin D, phos-



## SCIENTIFIC CULTIVATION OF GROUNDNUT (PEANUT) IN ARUNACHAL PRADESH

Chandra Kumar Singh, Nitin Kumar Paode,  
Kirti Vignya Kendra, Tawang, Arunachal Pradesh

Groundnut is an important commercial oilseed crop. Groundnut has 35% share of the total oilseed area and contributes nearly 40% of the total oilseed production. Groundnut is a rich source of energy due to its high oil and protein contents. It supplies about 5.6 calories/grain when consumed raw and 5.8 calories/grain when consumed roasted. Groundnut seed contains about 45% oil and 26% protein. The groundnut oil is normally used as cooking purpose. Groundnut oil is also used for preparation of Vanaspati ghee, soaps, cosmetics, cold cream etc. Groundnut kernel are eaten raw, roasted. Groundnut kernel have about 25-30% protein which is 1.3 times higher than meat, 2.5 times higher than eggs and 8 times higher than fruits. Groundnut oil cake is valuable cattle feed and organic manure. The groundnut cake contains 7.0-7.3% N, 1.5-1.6% P and 1.3-1.4% K.

## Health Benefits of groundnut:

- Groundnut help in fight depression.
- Groundnut help in promoting fertility.
- Groundnut boosts memory power.
- Groundnut aid in blood sugar control.
- Groundnut help in cancer prevention.
- Groundnut help in preventing gallstone.
- Groundnut help in lowering cholesterol levels.
- Groundnut help in lowering the risk of heart problems.
- Groundnut help in lowering risk of weight gain.



**Climatic requirement:** groundnut is essentially a tropical and subtropical crop. The germination of seed and initial growth of seedling is required 14-15°C temperature. The plant grown well in an area where the temperature is from 21-26.6°C. The low temperature lower the oil content of the kernel. The groundnut grow well in an area receiving annual rainfall of 50-125 cm. A well distributed rainfall at least 50 cm, during the month of July, August and September is essential for the rained crop.

## Soil:

Groundnut grows well in well-drained sandy and sandy loam soils because light soil helps in easy penetration of roots and their development.

## Varieties:

S. No.	Name of variety	Maturity(days)	Yield(Qt/ha)
1	ICGS 76	115-125	18-21
2	Girnar-1	115-120	22-25
3	CSMG 84-1	110-115	19-22
4	ICGV-86590	115-120	18-20
5	TKG19A	110-120	19-21
6	BAU-13	120-125	21.00
7	GG-20	110-120	19.60
8	DRG-12	115-120	17-20
9	OG52-1	120-125	19-22
10	V L Moongthali-1	120-125	16-20

## Intercropping:

In Arunachal Pradesh groundnut is grown as intercrop with Sesame, Arhar, Green gram, Black gram and maize etc.

## Sowing time:

In Arunachal Pradesh groundnut is sown in first fortnight of May to 15th June.



## MARKETING EFFICIENCY AND PERFORMANCE OF AGRO-PRODUCTS

N. K. Pandey and C. K Singh  
KVK, Tawang, Arunachal Pradesh

Agriculture play vital role in the Indian economy. Over 70 percent of the Indian population depend on Agriculture. Agriculture is an important sector of Indian economy as it contribute about 17% to the total GDP and provides employment over 60% of the population. Many role of Agriculture in Indian economy:-

- Share in National Income
- Largest employment providing sector
- Contribution to capital formation
- Providing raw materials to industries
- Market for industrial products

Agriculture marketing mainly focuses on buying and selling of Agricultural products. An efficient agricultural marketing system is essential for development of the agricultural sector as it helps for increased production and marketing system. Agriculture marketing has to undergo a series of exchanges or transfer from one person to another before it reaches the consumer. In supply chain a numbers of intermediaries are involved before its reach the consumer. The competitiveness of agricultural production and market efficiency are becoming more important with the commercialization of agriculture and the growing importance of global market access provide under the WTO. Without efficient markets to sell their crops, the farmers struggle to prosper. The task of the distribution system is to match the supply with existing demand by whole selling and retailing in various points of different markets like primary secondary or terminal.

Most of the agricultural products in India are sold by farmers to middle man in mandi, village traders. Products are sold in various ways. It might be sold at a weekly village market of farmer's village or in a neighboring village.

"Marketing is the performance of business activities that direct the flow of goods and services from producer to consumer or user." AMA (1960)

### Agricultural Marketing:

As a process which start with a decision to place a saleable farm commodity and it involves all

aspects of market structure of system, both functional and institutional, based on technical and economic considerations and includes pre and post harvest operation, assembling, grading, storage, transportation and distribution (National Commission on Agriculture).

Involvement of three important functions namely (a) assembling (b) preparation for consumption (processing) and (c) distribution. Agriculture marketing can also defined as the commercial functions involved of farm, horticultural and other allied products from producer to consumer.

### Market Efficiency and Performance:

Market will not self regulated in term of efficient use of resources and that no excess profits will get to any operator under perfect competitive condition, economist face difficult in defining the criteria for evaluating economic efficiency of markets. Agricultural economist obliged two approaches for analyzing market performance. The first approach analyzes the productive efficiency of well defined marketing sub- system while the second approach focus on analyzing the market structure and the resulting performance.

$$\text{Efficiency} = \frac{\text{Consumer price Market}}{\text{Total Marketing Cost}}$$

### Marketing Performance:

Performance is a measure of pricing and operational efficiency. Individual producers as well as the public have a stake because the degree of efficiency attend affect producer price and profit, cost to the consumer and their real income, and the general resource utilization. Improved marketing efficiency is a common goal of farmers, marketing organization, consumer and society (Kohls and Uhl, 1985). Higher efficiency means better performance, while lower efficiency denotes poor performance. Market are efficient when the ratio of the value of output to the value of input throughout the marketing system is maximized (Cramers and Jensen, 1982).

### Marketing Margin:

Marketing margin is the most commonly used



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## NURSERY MANAGEMENT FOR WET LAND RICE CULTIVATION

C.K. Singh,  
KVK, Tinsang, Arunachal Pradesh

Rice is the staple food of more than 60% of the world population. It is the staple food of most of the people of South Eastern Asia. About 90% of all rice grown in the world is produced and consumed in the Asian region. In India, rice is the most important and extensively grown food crop, occupying about 42 million hectares of land.

**Selection of land and area**

Select a fertile, well drained upland field near the source of irrigation. For transplanting one hectare area about 500 square meters is sufficient for nursery raising. In case of late sowing area of nursery should be increased to 500-700 square meter.

**Selection of Seed**

Seed should always be true to the variety, healthy, viable clean and to high germination percentage (80% or more). All these points are automatically taken care of in a seed certified by an authorised agency.

**Nursery bed preparation**

The soil is puddled by two or three runs of padder or three or four ploughings as well as to facilitate the decomposition of organic matter. After one or two days of puddling, divided the nursery area into narrow beds of 1.25 meter width of any convenient length depending upon the slope. Construct the drainage channels 30 cm wide in between the seed bed. Apply 225 gm Urea or 500 gm ammonium sulphate and 500 gm Single super phosphates per 10 square meters.

**Seed treatment and sowing time**

Treat the seed in carbendazim @2 gm/liter of water for 1kg of seed for 10 hours and drain excess water. Uniformly broadcast about two or three handfuls of seed on a square meter of seed bed in the of may and june.

**Water management**

Keep the seedbed saturated with water for first five days and then increases gradually the level of water upto 5.0 cm as the seedlings grow. Drain the excess water in periods of heavy rains during the first week of sowing.

**Nutrient management**

An application of 50 gm of urea per square meter may be made by topdressing in case of nitrogen deficiency symptoms.

**Weed management**

Pre-emergence application of Nitrofen @ 50gm, dissolve in 10 liter of water for 10 square meters.

**Pest management**

**Army worm-** Larvae feed voraciously on leaves, resulting in skeletonising of leaf blade.

**Control-** Drain out the water from nursery and spray chlorpyrifos@1.5 ml/liter of water.

**Thrips-** Both the nymph and adults lacerate the tender leaves and suck up the plant sap. As a result the yellowish lines are seen on the leaves.

**Control-** Spraying of monocrotophos @1.0 ml/liter of water.

**Green leaf hopper-** Both nymph and adults suck the sap from leaf and leaf shape. As a result yellowing of leaves from tip to onwards.

**Control-** Spray of quinalphos@1.0ml/liter of water.

**Rice zeaeworm -** Caterpillars' feed on green tissues of the leaves and leaves become whitish papery.

**Control-** Spray of monocrotophos@1.5 ml/liter of water.



Type of Non - Crop Activities	No. of FLD carried during the last five years	Productivity/Yield		Change in Income due to intervention of FLD	
		Before Adoption of new technology	After Adoption of new technology	Before Adoption of new technology	After Adoption of new technology
Composite Fish farming	60	9.0 q	17.0 q	126000	238000
Rice Fish Farming	14	Rice: 45.50 q	Rice: 50.65 q Fish: 3.82 q	52645	114582
Poultry (Vanaraja Breed)	460	1.5 kg/ bird Body weight gain in 06 month)	2.68 kg/ bird Body weight gain in 06 month)	370/ bird	685/ bird
Piggery	60	25 kg/ Pig (Body weight gain in 06 month)	40 kg/ Pig (Body weight gain in 06 month)	5000/ Pig	7800/ Pig

Note: Crops include, Cereals, Pulses, Horticulture, and Non-Crop includes Animals/Fishery/Poultry, Farm Machinery, Agriculture Enterprises.



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### INTRODUCTION OF ONION CULTIVATION IN TAWANG DISTRICT OF ARUNACHAL PRADESH

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The onion (*Allium Cepa* L.) belonging to family Amaryllidaceae is one of the most important vegetable crops grown in India. It is used in the form of green leaf, mature bulb and spices. The pungency in onion is due to a volatile oil known as allyl-propyl-disulphide. The bulb of onion consists of swollen base of green foliage leaves and fleshy scales. Maharashtra, Tamil Nadu, Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan and Punjab are the important onion producing state in India. As per National Horticulture Board estimates, India produced 209 lakh tones of onion from an area of 13.2 lakh ha during the year 2015-16.

Onion is valued for its bulbs having characteristic odour, flavour and pungency which is due to the presence of volatile oil Allyl-propyl-disulphide. Pungency is formed by enzymatic reaction when tissues are broken. Bulb is suitable for storage for long period and for long distance transport. It is used as salad and cooked in many ways in curries, fried, boiled baked and also used in making soups, pickles etc. Value addition in onion is done by marketing dehydrated onions and onion flakes. Onion bulb is rich in minerals like phosphorus (50 mg/100 gm) and calcium (180 mg/100 gm). Many medicinal uses are reported for bulbs and is



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## VALUE ADDITION OF QUALITY PROTEIN MAIZE (QPM)

C.K.Singh

*Krishi Vigyan Kendra, Tawang, Arunachal Pradesh*

The several QPM products has been developed after the treatment of maize with lime water (alkali processing). Lime water treatment increases the digestibility, palatability and makes the bound niacin free to get it available to the body. In the alkali processing, well cleaned maize grains are put in 1% lime water in the ratio of 1:2 by mass. The mixture is heated to 85°C for



30 minutes and then left for overnight. Next day, the grains are washed 3-4 times and then dried in sunlight and then stored in containers. The food products which have been developed from Quality Protein Maize in combination with other food materials are grouped as under:

### 1. Weaning Foods

It is very essential to provide food to infants at weaning stage i.e. after 6 months of birth, because mother's milk is not sufficient for the child after six months. To meet the nutritional requirement of these infants, weaning food from Quality Protein Maize along with pulses, nuts and oilseeds have been developed in several combinations. These foods are ready to eat products for infants, which can be given when demanded. These can be easily prepared at home with little technical knowledge.

### 2. Health food/Beverage

A number of food products such as health mix laddoo, chocolates/toffees, biscuits, leavened bread etc, have been developed from QPM in combination with pulses, nuts and oilseeds and dehydrated fruits & vegetables. Health mix is best suited to the needs of pre-school children,

## AMARANTH: A PROFITABLE AND NUTRITIONAL MULTI-PURPOSE CROP FOR HILLS

C.K.Singh

Krishi Vigyan Kendra, Tausang (Arunachal Pradesh)

Amaranth (*Amaranthus hypochondriacus*) cultivated for both its seeds which are used as grain and its leaves, which are used as vegetable. Both the leaves and seeds contain protein of an usually high quality. The grain is milled for flour or popped like popcorn. The leaves of both the grain and vegetable types may be eaten raw or cooked. The amaranths that are grown principally for vegetable use have better tasting leaves than the grain type.

### Nutritional Value

Amaranth is quite nutritious because of its high content of vitamin C, iron, carotene, calcium, folic acid and protein. Amaranth grain has more protein than corn, and this protein is high quality. The protein is high in the amino acid lysine, which is the limiting amino acid in cereals like maize, wheat and rice. The protein is also relatively rich in the sulfur containing amino acids, which are normally limiting in the pulse crops.

### Variety and inter cropping

Vivekanand Parvatiya Krishi Anusandhan Sanssthan, Almora an amaranth variety named VI. Chua-44 was released in the year 2005. It takes about 115-120 days to mature and has a yield potential of 10-13 q h<sup>-1</sup>. It may be intercropped with maize, beans, peppers or squash.

### Climate and soil

Amaranth is grown in tropical lowlands to altitude up to 3500 meter in the Himalayas. In the tropics, altitude above 1000 meter is considered best. The loam soil is best suited for amaranth cultivation. Although, it tolerates droughts and low fertility.

### Seed rate and sowing time

For one hector land 1-2 kg seed is sufficient. Treat the seed with thiram@ 2 g kg<sup>-1</sup> of seed. Seeds may be planted in a nursery in the month of May to June. Transplanting is done in about two week's old plant when plants grows to 5-10 cm tall.

### Manure and fertilizer management

During land preparation 10-15 tonnes per hectare composted is applied at a time as a basal dose. General recommendations are 40 kg nitrogen, 20 kg phosphorous and 20 kg potash per hectare for better results. The half dose of nitrogen and full dose of phosphorous and potash is applied at the time of sowing. The remaining nitrogen is top dressed in two splits, one at the time of thinning and rest at ear head formation stage.

### Water management

Generally, 2-3 irrigations are sufficient. If moisture is limiting, irrigation must be done at the time of ear head emergence because it is most critical stage of moisture stress.



## CULTIVATION AND USE OF AZOLLA AS NUTRITIVE FEED SUPPLEMENT FOR THE LIVESTOCK

Chandra Kumar Singh  
KVK, Tamsang, Arunachal Pradesh-790104

Azolla is a free-floating water fern that floats in water and fix atmospheric nitrogen in association with nitrogen fixing blue green algae. An Azolla frond consists of sporophyte with a floating rhizome and small overlapping bi-lobed leaves and roots. Azolla is used as a bio fertilizer for wetland rice cultivation. The higher crude protein content (above 20%) and presence of essential amino acids (high lysine content) makes azolla relevant for livestock, poultry and fish farmers. It is also rich in vitamins like A & B<sub>12</sub> and minerals like calcium, phosphorous, potassium, magnesium etc. Bioactive substance and biopolymers are also present in azolla.



### Chemical composition of Azolla

The variation in the nutrient composition of azolla occur due to the difference in strains and environmental conditions like nutrition, light intensity, temperature etc. under which it is grown.

The chemical composition of azolla is presented in table.

Nutrient	% of dry matter
Crude protein	21-24
Crude fibre	9-12
Ether extract	2.5-3
Ash	10-12
Nitrogen free extract	45-47
Calcium	0.7-1.1
Phosphorous	0.8-1.2
Lysine	0.98
Methionine	0.34
Cystine	0.18



### Azolla Cultivation

**1. Environmental requirements:** Azolla is found in ponds, ditches and wetlands warm temperature and tropical region throughout the world. It requires light for photosynthesis and grows well in