Tubers - A Future Food Security Crops

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Roots and tubers are energy yielding foods which are essential components in our daily diet. These are important cultivated staple energy sources, second to cereals, generally in tropical regions of the world. They include potatoes, cassava, sweet potatoes, yams, and aroids belonging to different botanical families but are grouped together as all types produce underground food. They will adapt to diverse soil and environmental conditions and a variety of farming systems with minimum agricultural inputs.

Importance of Root and tuber crops

- ✓ They meet local food preferences, providing an important part of the diet as they produce more edible energy per hectare per day than any other crop groups.
- ✓ They add variety to the diet in addition to offering numerous desirable nutritional and health benefits such as antioxidative, hypoglycemic, hypocholesterolemic, antimicrobial and immunomodulatory activities.
- ✓ They play an important role in food security, nutrition and climate change adaptation.
- ✓ They provide important sources of income through direct sale and value-addition via processing for food (Chips, thickening agents, sago, fryums, papad, sweets and confectionaries) and non-food uses (Sizing agents, dyeing and printing paste, laboratories etc.,)
- ✓ Requires less maintenance in cultivation
- ✓ Immense potential for value added products (Major raw material source for small enterprises)

Tuber crops are resilient to climate change due to its capacity to surge over the adverse conditions by becoming dormant and resuming tuber growth during favourable conditions, thereby, bringing down the chances of crop failures. Cassava is one of the major food of the many regions and it is considered as the future food security crop having ability to sustain under changing climate conditions especially during drought. Similarly sweet potato can tolerate saline conditions and it yields considerably well under such condition. Elephant foot yam, tania and arrow root are tolerant to shade conditions and hence they can be grown in different cropping systems.

A tuber is a type of plant stem that stores nutrients and energy for the plant. It is usually found in underground and serves as a food source for both the plant and humans. Tubers are rich in carbohydrates, fiber, vitamins, and minerals, making them a nutritious addition to a healthy diet. They can be cooked in various ways, such as boiling, baking, steaming or frying, and can be used in numerous recipes to add flavour and texture to meals. Tuber vegetables encompass various groups, including root tubers, true tubers and storage roots. These underground structures, derived from the parent plant's stem or root, serve as energy reservoirs for the growth of new plant shoots. They come in different shapes, sizes, and colours – from small tubers like new potatoes to a large tuber.

Major tuber crops: Tuber vegetables can be categorized into numerous groups, each with its unique characteristics. Some common tubers include potatoes, sweet potatoes, yams, and cassava. Additionally, lesser-known tubers like jicama and taro root offer intriguing flavours and culinary possibilities.

Potato: Potatoes are starchy tubers with a smooth texture perfect for frying, baking, or mashing. They are part of the night

shade family of the food. The edible root of the potato plant is, in fact, a stem tuber. The potato's edible root is formed from the thick underground stems called stolons. These stem tubers develop as a result of special growth processes within the plant.

Sweet potato: Sweet potatoes, including orange, purple and white sweet potatoes are a versatile and nutritious tuber with a naturally sweet taste and a creamy texture. This delicious root vegetable not only satisfies the taste buds, but they're also super nutritious. Rich in dietary fibre, potassium, and vitamin A, sweet potatoes can support healthy digestion, regulate blood pressure, and promote good vision. Whether baked, roasted, or mashed, these delicious tubers are a nutrient-dense choice for those looking to incorporate wholesome foods into their diet.

Yam: Often confused with sweet potatoes, yams have

a starchy texture and a slightly sweet flavour. Not only delicious, but they also full of vitamins and nutrients. Rich in vitamins A and C. Yams are excellent for boosting immune function and promoting healthy skin. These root vegetables are also high in fibre, aiding in digestion and promoting a feeling of fullness. Additionally, yams provide a good source of potassium, which is vital for maintaining proper heart function.

Cassava: These starchy root vegetables have a very mild taste. It's a staple in many diets, particularly in Africa, Asia, and South America. Used both as a flour and consumed as a whole, it serves as a vital ingredient in various regional dishes. This nutrient-packed tuber is a rich source of carbohydrates, providing sustained energy while also being naturally gluten-free, making it an excellent alternative for individuals with gluten sensitivities or celiac disease. Additionally, cassava is a great source of vitamin C and contains important vitamins and minerals such as folate, and potassium. Whether boiled, fried or baked, cassava offers a delicious and nutritious addition to any meal.

Taro: This nutrient-dense root vegetable is a great source of dietary fiber, vitamins and minerals, including potassium, vitamin E and magnesium. Beyond its nutritional value, taro offers a wide array of culinary uses. From being boiled, steamed or roasted to make tasty side dishes or stews, to being transformed into crispy taro chips or taro desserts, this tuber adds a unique and satisfying touch to any dish.

Tapioca: Tapioca is cultivated extensively as an annual crop in tropical region for its edible starchy tuberous roots. The roots are nutritious and wholesome, and are used as a supplementary food as it is a major source of carbohydrates. The tapioca plant gives the highest yield of food energy per cultivated area per day among crop plants, apart from starch its root also contain significant amount of calcium, phosphorous and vitamin C. It is also called poor man's vegetable. Various processed products of export importance are also made from tapioca.

Opportunities in production of tuber crops

1. Great scope for product diversification and value addition in tuber crops
2. Opportunity for industry level bio-ethanol production from cassava
3. Scope to develop prophylactic and therapeutic functional food from tuber crops.
4. Can fit well in different cropping systems
5. Tremendous scope as nutritious food.

Threats or challenges

1. Poor market linkage
2. Non availability of planting materials
3. Declining in area and production of Cassava and Sweet potato
4. Wide price fluctuations

Tapioca, elephant foot yam, colocasia, yam and sweet potato are commonly grown tuber crops. These tuber crops are very important for the food security and income of people in many parts of the country. They are considered as the future food security crop having the ability to tolerate changing climate conditions especially drought and can be grown even in low fertile soil with economic yield. It is essential to popularize these tuber crops which have high calorific values. Further with value addition, these tuber crops have good prospects in the industrial sector.

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