Status of Root Crops Production, Utilization and Marketing in the Philippines

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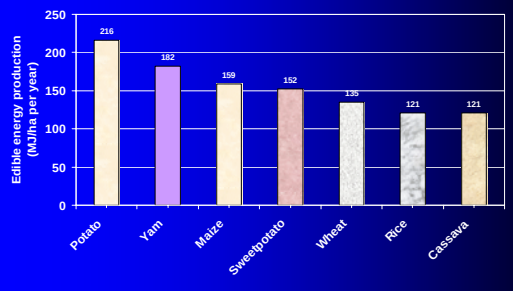
Root crops are crops of the poor, and occupy mainly agriculturally marginal environments.

Root crops are among the top 10 producing crops in terms of carbohydrate production

Production of edible energy from roots, tubers, and major cereal crops.

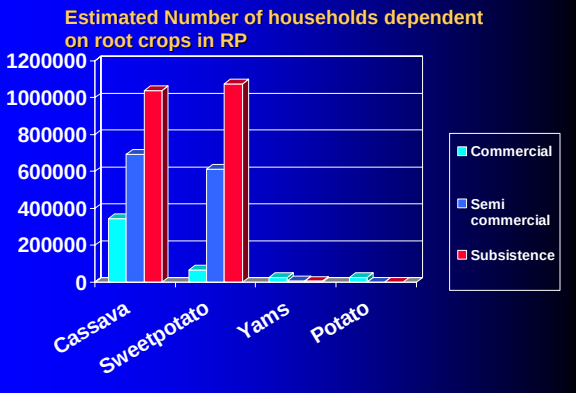


These crops have broad adaptability that allows them to produce even under unfavorable growing conditions such as drought and poor soils

These and other features endow root crops with special capacity to contribute to food security, equity, poverty alleviation, and environmental protection.

Root Crops in the Philippine Agriculture

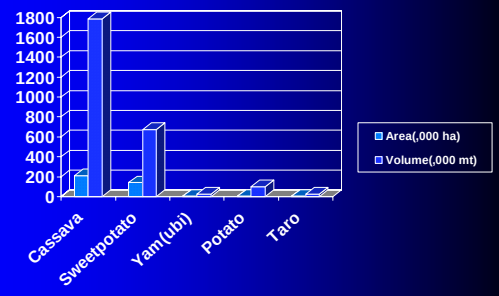
- Root crops are important sources of food, feed and starch among Filipinos.
- About half a million hectares of agricultural land are devoted to root crops production annually.
- Root crops contribute 4% to gross value added from agriculture.



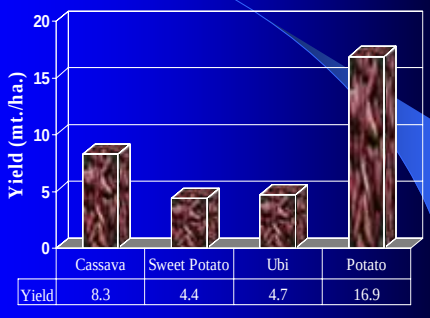
Rootcrops in the Philippines

- **Major rootcrops**
  - Cassava
  - Potato
  - Sweetpotato
  - Yam
  - Taro/Gabi
- **Minor rootcrops**
  - Arrowroot
  - Yambean
  - Tugui
  - Gabing San Fernando
  - Palao, Palawan

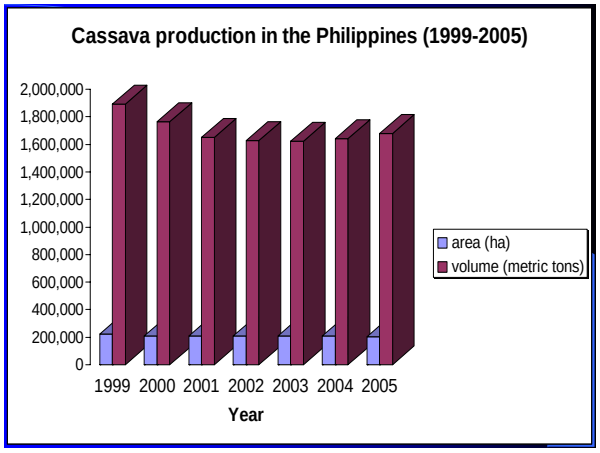
Area and volume of root crops in the Philippines

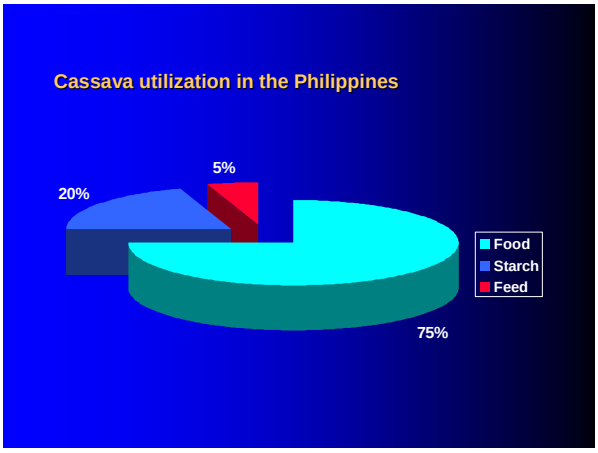


Average Yield (in mt/ha)



Production and utilization trends of cassava


Cassava production in the Philippines (1999-2005)
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1999 2000 2001 2002 2003 2004 2005
Year
area (ha)
volume (metric tons)


Cassava utilization in the Philippines
5%
20%
75%
Food
Starch
Feed


CASSAVA
Grates
CASSAVA
Grates


URIVIC
URIVIC

Cacharon

Cassava volume of exports (tons), Philippines 1999-2003

Commodity	1999	2000	2001	2002	2003
Manioc, fresh/dried and pellets	644.48	417.76	263.46	817.62	840.44
Manioc, flour and powder	0.84	0.93	0.29	0.16	65.79

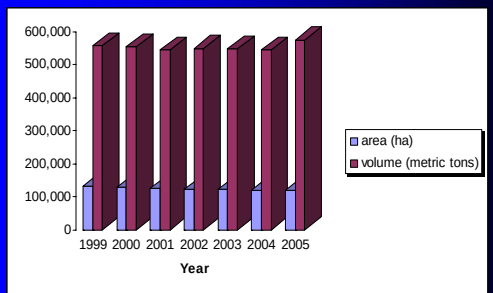
Average farmgate and wholesale price, Philippines, 1999-2003 (Peso/kilo)

Cathegory	1999	2000	2001	2002	2003
Farmgate	3.53	3.57	3.17	3.16	4.05
Wholesale	4.59	4.18	5.08	6.08	5.42

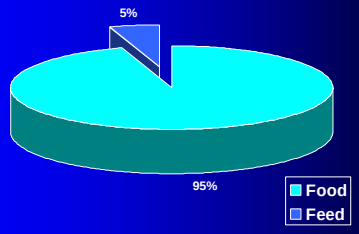
1 US Dollar = P50.00

Production and utilization trends of sweetpotato and yams

Area planted and volume of production of sweetpotato in the Philippines (1999-2005).



SP utilization in the Philippines



Sweetpotato Pickles

Sweetpotato fries

Sweetpotato average farmgate, wholesale, and retail prices (Peso/kilo)

Cathegory	1999	2000	2001	2002	2003
Farmgate	4.79	4.73	5.22	6.26	6.43
Wholesale	8.56	8.06	9.10	9.39	9.14
Retail	12.35	12.82	13.41	13.88	13.80

1US Dollar = P50.00

Production and utilization trends of potato

Potato production trend, 2002-2005

	Volume (000 tons)	Area (000 ha)	Yields (t/ha)
2002	36.7	2.36	15.55
2003	36.8	2.39	15.39
2004	37.8	2.45	15.43
2005	38.2	2.47	15.46

Source: BAS, 2006

Volume of Philippine potato imports, 2004-2005

Potato Product Types Volume (MT)	2004	2005
Fresh, frozen, chilled	2,643.9	5,026.49
Flakes, flour, starch, dehydrated	2,864	4,778.19
Seeds	379	190.96
Preserves, others	17,536.7	30,694.67
Total	31,420.25	66,700.82

Value of Philippine potato product imports, 2004-2005

Potato Product Types Value (000 US dollars)	2004	2005
Fresh, frozen, chilled	711.34	1,461.20
Flakes, flour, starch, dehydrated	2,357.83	3,313.09
Seeds	152.50	70.79
Preserves, others	10,194.30	17,275.86
Total	22,505.16	32,826.91

Projections for Root Crops

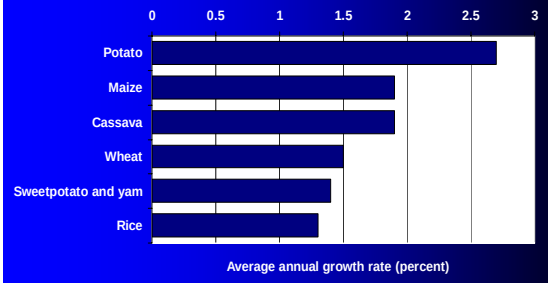
Projected production and utilization of cassava and its products in RP

Food- increasing with increase in population. Urbanization will provide new opportunities provided extending shelf life of fresh roots and conversion of cassava to more stable and convenient forms.

Starch- Product stability and high value byproduct provide corn advantage over cassava for starch. cassava can compete with corn in terms of production cost for starch. Local cassava starch production is expected to decrease due to uneven tariff though actual domestic use may increase. Ethanol use from cassava will increase.

Feed- increasing with increase in livestock production with the widening gap of feed corn demand and production

Projected growth rates for major food crops in developing countries, 1993-2020.



Projected per capita supply and consumption of root and tuber crops in the Philippines, 1990-2020

Crop	Per capita consumption 1990-1999	Projected per capita consumption		Income elasticity
		2000-2010	2011-2020	
Sweetpotato	8.97	7.82	10.40	0.56
Cassava	6.99	7.06	9.36	0.66
Irish potato	0.88	0.78	1.03	0.56
Roots and tubers	23.58	21.39	28.25	0.58

Projected growth rates in production of cassava and aroids (average annual percent) in Asia

Category	1983-96	1993-2020A	1993-2020B
Area	1.37	0.73	0.94
Yield	0.46	1.00	1.00
Production	1.83	1.74	1.95

A Baseline scenario
B High growth scenario

Projected per capita consumption of meat in the Philippines

	Per capita consumption (kg/yr)	
	2001-2010	2011-2020
Beef	3.63	5.82
Pork	13.81	17.18
Poultry	6.08	7.26

Projected growth rates in domestic utilization of cassava and aroids (average annual percent) in developing countries

Category	1983-96	1993-2020A	1993-2020B
Food demand	2.10	1.99	2.24
Feed demand	1.66	1.62	1.72
Total use	2.49	1.93	2.15

A Baseline scenario
B High growth scenario

Projected growth rates in domestic utilization of sweetpotato and yams (average annual percent) in developing countries

Category	1983-96	1993-2020A	1993-2020B
Food demand	-0.65	0.44	0.50
Feed demand	3.42	1.81	2.23
Total use	1.15	1.25	1.46

A Baseline scenario
B High growth scenario

Projected growth rates in production of sweetpotato and yams (average annual percent)

Category	1983-96	1993-2020A	1993-2020B
Area	-0.50	0.27	0.35
Yield	0.64	0.97	1.10
Production	0.14	1.25	1.45

A Baseline scenario
B High growth scenario

RP sweetpotato and yam prospects

- ✓ Demand for fresh roots of sweetpotato will certainly increase with increase in population.
- ✓ Producers near to urban markets will benefit more than other producers.
- ✓ Sweetpotato does not appear to be a competitive source of starch in the Philippines unless niche markets- willing to pay price premium- are secured.

RP sweetpotato and yam(ubi) prospects

- ✓ Processed food products from sweet potato capitalizing on its bioactive compounds such as anthocyanin and beta-carotene has better market prospects.
- ✓ Prospect of utilizing sweetpotato for feeds depends largely on increasing yields from 7.0-8.0 mt/ha in good farms to about 15 mt/ha.
- ✓ Demand for yam products locally and abroad will continue to rise.

Utilization of cassava and sweetpotato for biofuel program

Comparison of Alcohol Yield from Sugarcane, Cassava and Sweetpotato.

Crop	Yield (t/ha)	Alcohol (liter/ton)*	Alcohol L/ha/yr.
Sugarcane	75	67	5,025
Cassava	25	180	4,500
Sweetpotato	40**	125	5,000

*De Menezes, 1978
** assuming two croppings/year

Improved cassava varieties suited for ethanol production

Variety Name	Ave. Yield (ton/ha)	Starch Content %	Ethanol Liter/ton	Ethanol Liter/ha.*
1. NSIC Cv-22	31.0	27	179	5,549
2. NSIC Cv-23	26.0	28.5	190	4,940
3. Lakan	35.0	25.0	166	5,810
4. NSIC Cv-30	35.0	28.1	187	6,545

* Estimated production base on average yield per hectare

Sweetpotato Varieties Suited for Ethanol Production

Variety Name	Ave. Yield t/ha	Starch content %	Ethanol L/ton	Total ethanol L/ha
1. VSP-6	21.06	21.30	133	2,793
2. PSB Sp-15	15.0	25.0	156	2,390
3. PSB Sp-16	15.0	26.15	163	2,451
4. PSB Sp-17	17.5	20.89	132	2,310
5. NSIC Sp-31	17.0	23.64	147	2,499

Sweetpotato is harvested for 3 to 4 months

Fuel Ethanol Demand and Supply Requirements

Percent Blend	Ethanol Requirements in million liters	Total no of plants required	Req plantation in ha sugarcane	Req plantation in ha cassava	Req. plantation in has swtpotato
5%	266	9	63,610	47,936	53,200
10%	721	16	171,091	131,091	144,200

DOE 2006 data

Fuel ethanol program implementation

- Voluntary use 10% blend 2005- 2007
- Nationwide use of 5% blend mid 2007-mid 2009
- Nationwide use of 10% blend mid 2009 to 2010.

Bioethanol fuel program

- Reduce dependence on imported oil
- Increase economic activity in the countryside
- Booster employment
- Environmentally friendly
- Improve combustions and reduces emission

Problems and weaknesses of root crops

- **Knowledge base is still much smaller and less accessible compared to cereal crops**
- **Slow multiplication and bulkiness of planting materials**
- **Labor intensive**
- **Often relegated to marginal areas which typically lack infrastructure and input supply system**

Problems and weaknesses of root crops

- **High perishability and fear of HCN in cassava**
- **Seasonality of production**
- **Unstable and limited market beyond food**

External influences positively affecting root crops' demand and supply

- **Population growth and urbanization**
- **Trends in associated commodities**
- **Dwindling prime agricultural areas**
- **Expanding market**
- **Improved technologies**

Strategies for increase utilization of root crops

- Partnership with local government, Non governmental organizations and private sectors.
- Collaborative research with private sectors and investors
- Participatory undertakings
- Advocacy on value adding for root crops

The potential of root and tubers in the years to come:

"Root and tuber crops have myriad and complex roles to play in feeding the world in the coming decades. By 2020, roots and tubers will be integrated into emerging markets through the efficient and environmentally sound production of a diversified range of high-quality, competitive products for food, feed and industry. These crops' adaptation to marginal environments, their contribution to household food security, and their great flexibility in mixed farming systems make them an important component of a targeted strategy that seeks to improve the welfare of the rural poor. We estimate that by 2020 well over two billion people in Asia, Africa and Latin America will use root and tubers for food, feed and income. Many of these people will be among the poorest of the poor."

(Scott et al. 2000)