



# CROP DIVERSIFICATION

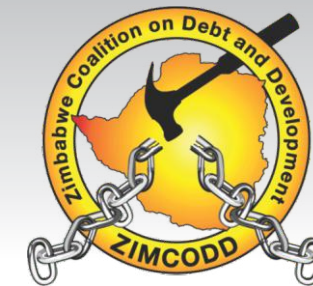


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*Investing in people for Social and economic Justice*

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# Definitions

**Diversification** – it is the growing of a variety of crops in one area . It also means doing more than one activity such as working with new crops, adding value to existing crops and also engaging in livestock activities

**Risk** – It is the possibility of loss due to uncertainty and imperfect knowledge in decision making

**Spot application** – it is applying basal or top dressing fertilizers close to the plan instead of the whole field

**Profit** – it is the positive balance you remain with after deducting the cost of giving the service

**Loss** – it is the negative balance you remain with after deducting the cost of giving the service

**Labour costs** – these are the total expenses for family labour and hired casual labour in producing a specified commodity

**Post harvest costs** – these are the total expenses incurred after harvesting which may include grain bags, transport to the market and other marketing costs

## **Acknowledgements:**

ZIMCODD would like to thank its Social and Economic Justice Ambassador, Tendai Masora, who is based in Gokwe South as an AGRITEX Officer for compiling this invaluable information to assist small scale farmers to diversify their crops and secure their source of livelihoods in agriculture. The Organization is also grateful to its Funding partners who continue to appreciate the need to support people based initiatives.

# Foreword

This booklet is meant to improve the livelihoods of small holder farmers through urging them to diversify their crops and cushion themselves from single crop losses. Since 2005 ZIMCODD has been working with small scale farmers in Gokwe and Chipinge with the aim of building their capacities to effectively participate in production and market systems of their crop. The major objective is to foster fair and just production and marketing policies for decent and sustainable rural livelihoods.

From the ZIMCODD baseline survey that was undertaken in 2012 a number of challenges faced by the farmers were revealed, among the challenges were the following;

- Lack of Adequate government support such as subsidies, free seed and price support.
- Monopoly in the supply of seed and formation of cartels during the selling season causing exploitation and poor cotton prices at the end of the farming season.
- Farmers not adequately mobilized to stand with one voice to express their concerns.
- Lack of skills on cotton grading.
- Resuscitation of local textile industries to stimulate local demand for cotton and protect farmers from the vagaries of the international markets.
- Lack of adequate infrastructure such as ginneries at local levels to venture into value addition.
- The negative dynamics in contract farming that perpetuate exploitation and unfairness in cotton farming.

In order to respond to the above mentioned challenges among other challenges ZIMCODD has been encouraging its rural livelihoods sector to engage in crop diversification in order to safeguard their livelihoods from losses emanating from heavily depending on one crop. The summaries on a number of crops that farmers can venture into are therefore done in the spirit of defending livelihoods and ensuring sustainable rural livelihoods especially in cotton growing areas.

## About ZIMCODD

The Zimbabwe Coalition on Debt and Development, ZIMCODD, is a socio-economic justice coalition established in February 2000 to facilitate citizens' involvement in making public policy and practice pro people and sustainable. ZIMCODD views Zimbabwe's indebtedness, the unfair global trade regime and lack of democratic people-centred economic governance as root causes of the socio-economic crises in Zimbabwe and the world at large. Drawing from community-based livelihood experiences of its membership, ZIMCODD implements programmes targeted at;

- Educating the citizen
- Facilitating policy dialogue among stakeholders
- Engaging and acting on socio-economic governance at local, regional and global levels

ZIMCODD's headquarters are in Harare with a regional office in Bulawayo

### **Vision**

Sustainable socio-economic justice in Zimbabwe through a vibrant people based movement.

### **Mission**

To take action in redressing the Debt burden and Social & Economic Injustices through formulation and promotion of alternative policies to the neo-liberal agenda.

### **Objectives**

- To raise the level of economic literacy among ZIMCODD members to include views and participation of grassroots and marginalised communities;
- To facilitate research, lobbying and advocacy in order to raise the level of economic literacy
- on issues of debt, trade and sustainable development;
- To formulate credible sustainable economic and social policy alternatives;
- To develop a national coalition, and facilitate the building of a vibrant movement for social and economic justice.

## Advantages of Diversifying

1. Better use of land, labour and capital. Better area land use through adoption of crop rotation.
2. Farmer and labour engaged all year round in different activities.
3. Less risk to crop failure and market price of the product.
4. Proper utilization of by products as cattle, poultry and piggery are reared with crop production by products.
5. Regular and quicker return is obtained from various enterprises.
6. Good soil fertility due to crop rotation.

## Cotton Background

The goal of approaching cotton crop farming is to increase farmers' profit so that living standards are maintained and improved. Presently cotton production is a failure due to the tilted production and marketing systems against the small scale producers. Below is a cotton crop budget for 1 hectare (1ha)

Income \$	Details	Expenditure \$	Balance \$
	15kg cotton seed	27.00	
	100kg Compound L @ \$38 each	76.00	
	100kg AN @ \$38 each	76.00	
	Cabarly 2 packs @ \$16 each	32.00	
	Amitraz 2 litres Red Spider Mite @ \$6 each	12.00	
	Synthetic Pyrethroid 2 litres @ \$18 per litre	36.00	
	Acetamac 100g	4.00	
	Selling 4 bales/ per ha @ \$0.40c per kg (800kg)		
320.00	Total Income		
	Total Expenditure	263.00	
	Profit \$320.00 - \$263.00		57.00

**Note:** Crop budget does not include hired labour. 8 bales of cotton can be achieved when the inputs like Compound L, AN and chemicals are supplied on time and are not expired chemicals.  
The return per hectare is \$57.00. Expenses such as school fees, food, medical and clothing expenses cannot be covered by an income of \$57.00

The following risk chart shows the risks and effects on cotton crop

Risk	Causes	Effects	Solutions
1. Fertilizer failure	<ol style="list-style-type: none"> <li>1. High cost of fertilizer e.g. Compound L, chemicals</li> <li>2. Inadequate application</li> <li>3. Poor soil fertility</li> <li>4. Lack of irrigation</li> </ol>	<p>Low income</p> <p>Very low yields</p> <p>Low yields in the next season</p>	<p>Good agricultural practices on other crops</p> <p>Diversification</p>
2. Contract farming losses	<p>Weaknesses of contract farming</p> <p>Inadequate application of chemicals</p> <p>Unfair price differential between farmer and contractor</p> <p>Overflooding of cotton on the market</p>	<p>Losses on the losing side</p> <p>Low yields in the next season</p>	Crop diversification
3. Cash flow failure	<p>Farmer fails to clear credits</p> <p>Low cash in hand</p> <p>Exploitation hence control of prices is difficult</p>	<p>Low yields</p> <p>Recovery team standards deteriorates</p>	Crop diversification

## The Way Forward

**Diversification:** Diversification can be achieved by growing a variety of crops in one area not just one crop. If one crop fails in a year the area can still survive. It also means doing more than one activity such as working with new crops, adding value to existing crops and also engaging in livestock activities. In short it reduces risk due to bad weather, fluctuating prices. It is a logical response to both. Farmers do not suffer complete ruin from external challenges.



**Risk:** The possibility of loss due to uncertainty and imperfect knowledge in decision making.

**Proposed Diversification Crops:**

Maize, soya beans, sugar beans, ground nuts, cow peas and sesame

**MAIZE CROP PER HECTARAGE**



**Budget**

Income \$	Details	Expenditure \$	Balance \$
600.00	20kg maize seed @ \$23 each	46.00	
	50kg Compound D	35.00	
	100kg AN @ \$35 each	70.00	
	40 Empty bag @ 50c each	20.00	
	Selling 2 tonnes harvested @ \$300 per tonne		
	Total Income		
	Total Expenditure	171.00	
	Profit \$600 - \$171.00		429.00

**Note:** Spot application or micro dosing method is used for both basal and top dressing fertilizer application. Use of manure and Compound D is highly effective.

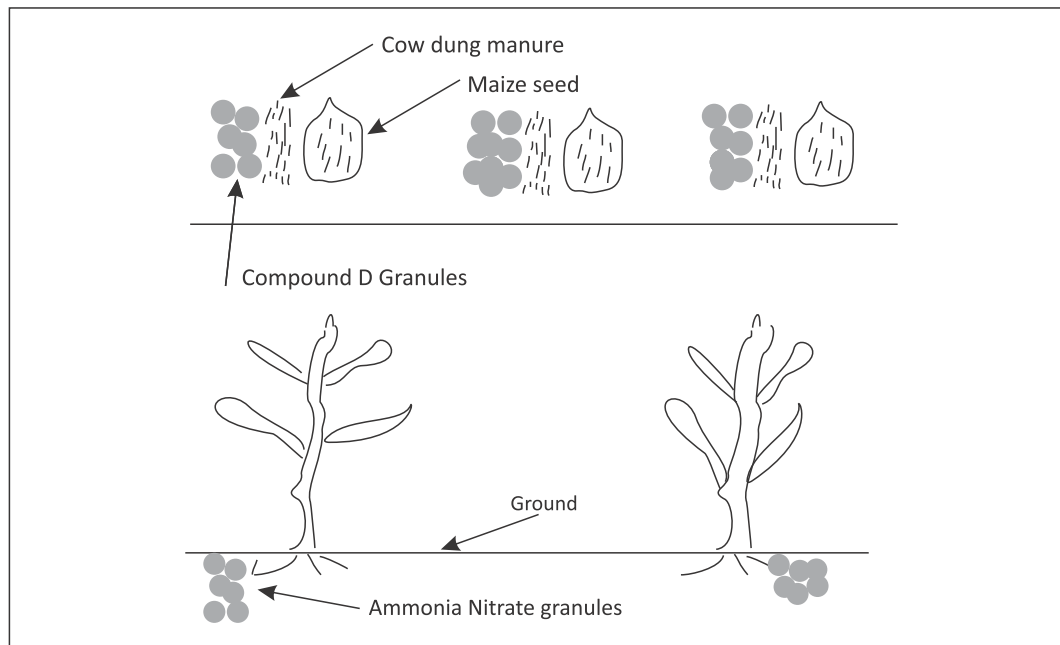


Diagram illustrates spot application on both Compound D and AN application

Maize seed varieties suitable for low rainfall areas Region 3 and 4 are short season to medium varieties which are:

Seed Co	Pannar Seeds	Pioneer Seeds
SC403	4m-21	PHB 2859
SC411	413	PHB 3253
SC 533	Pan53	

These varieties take between 90 to 120 days to mature.



#### Climatic conditions

- Summer crop
- Well drained heavy textured soils, sand clay loams
- Soil pH 5.5 – 6.5
- Rainfall between 400mm up to 650mm evenly distributed is ideal



#### Planting rates

- 20kg per hectare
- Spacing 90cm x 30cm
- Yield – 2 tonnes to 6 tonnes
- Compound D - 50kg
- AN – 100kg
- Spot application

## SOYA BEANS/ BIMHA SEED PER HECTARE



### Budget

Income \$	Details	Expenditure \$	Balance \$
1 000.00	75kg seed @ \$42.00 each	126.00	
	Rhizodium 50g (innoculant)	8.00	
	Compound D 50kg	35.00	
	30 empty bags @ 50c each	15.00	
	Selling 2 tonnes harvested @ \$500 per tonne		
	Total Income		
	Total Expenditure	184.00	
	Profit \$1 000 - \$184.00		816.00



### Varieties

- Bimha variety – most suitable for low rainfall areas like Checheche area
- Other varieties are
- Suprano – 170 days to mature
- Storm – 150 days to mature
- Soma – 150 days to mature



### Climatic conditions

- Rainfall at least 600mm well distributed
- Temperature between 18 Degrees Celsius to 24 Degrees Celsius



### Soil

- Well drained soil with texture ranging from sand loam to clay loam
- On heavy soils it grows well
- Ph range 5.3 to 5.8
- Yield from 1 tonne to 4 tonnes per hectare



### Spacing

- 25cm x 75 cm
- Planting depth 5cm

## SUGAR BEANS CROP PER HECTARAGE



### Budget

Income \$	Details	Expenditure \$	Balance \$
	50kg seed @ \$30 per 10kg	150.00	
	50kg Compound D	35.00	
	Roger 1 litre	9.00	
	30 Empty bags @ 50c each	20.00	
	Selling 2 tonnes harvested @ \$300 per tonne	15.00	
1 165.00	Total Income		
	Total Expenditure	209.00	
	Profit \$1 165.00 - \$209.00		956.00



### Variety

- Most common is sugar beans
- 4 months maturity including harvest



### Climatic conditions

- Sensitive to frost
- Well drained soil with good organic matter content
- Soil pH 5.0–5.5



### Fertilizer application

- Basal 100kg Compound D – spot application
- Top dressing- beans are a nitrogen fixing crop. Too much nitrogen causes rank growth. If possible do not use any top dressing

## GROUND NUTS PER HECTARAGE



### Budget

Income \$	Details	Expenditure \$	Balance \$
	80kg seed	90.00	
	50kg Compound L	38.00	
	Dimethoale 40EC	7.00	
	40 Empty bag @ 50c each	20.00	
	Gypsum 50kg	9.00	
	Selling 1 tonne shelled per ha @ \$1 100 per tonne		
1 100.00	Total Income		
	Total Expenditure	144.00	
	Profit \$1 100.00 - \$144.00		956.00



### Variety

- Kasawaira – 100 to 140 days to mature



### Climate and Soil requirements

- Temperature 25 – 35 degrees Celsius
- 500mm to 600mm rainfall during growing season
- Deep well drained soil with pH 3 - 6.5



### Spacing

- Seed rate 80kg – 100kg per hectare
- 5cm – 7cm in row and 45cm inter row
- Depth 5cm



### Fertilizer application

- Gypsum 50kg
- Farm yard manure

## COW PEAS PER HECTARAGE



### Budget

Income \$	Details	Expenditure \$	Balance \$
400.00	40kg seed @ \$15 per 20kg	30.00	351.00
	Roger 1 litre	9.00	
	50kg Compound D	70.00	
	20 Empty bags @ 50c each	10.00	
	Selling 1 tonne per hectare at 40c per kg 0.40c x 1 000kg		
	Total Income	49.00	
	Total Expenditure		
	Profit \$400 - \$49.00		



### Varieties

CBC1, IT18, CBC2 and CBC3



### Climate and soil conditions

- Well drained soils with a pH of 6.0 to 7.0
- Cow peas does best in natural regions 3, 4 and 5
- 250mm – 500mm rainfall
- Prone to frost



### Spacing

- Bushy variety – 45cm x 15cm 40kg/ha (*katumbe*)
- Spreading 75cm x 20cm 25kg/ha



### Planting depth

- 5 – 7cm

## SESAME/ RUNINGA PER HECTARE



### Budget

Income \$	Details	Expenditure \$	Balance \$
600.00	3kg seed	9.00	571.00
	Manure		
	40 Empty bags @ 50c each	20.00	
	Selling 1 tonne per hectare at 60c per kg = \$600		
	Total Income		
	Total Expenditure	29.00	
	Profit \$600 - \$29.00		

Sesame can yield up to 2.5 tonnes per hectare. Sesame can do well without application of basal and top dressing fertilizers. It is also less laborious, not affected by diseases. One of the most paying crops is sesame which is used in the baking industry and it is in high demand.







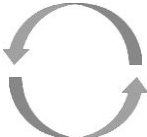
Compared to cotton, sesame is highly nutritious, not expensive to produce and profitable. No harmful chemicals like roger or dimettioate are used in sesame production.

## Marketing 2014










Crop	Prices \$	Company	Contact
Maize	Per tonne		
	320.00	GMB	nearest depot
	300.00	Cargil	nearest depot
	290.00	Delta	nearest depot
	300.00	Peak Trading	0773 466788
	310.00	Taguta Millers	0712 436471
Soya beans	500.00	Cargill	nearest depot
	490.00	Peak Trading	0773 466788
	520.00	National Foods	Harare, Bulawayo, Gweru, Kwekwe
	550.00	Jasbro	09 68198
Sugar beans	1 100.00	E. T. G Parrogate	Harare
	1 300.00	Jasbro	09 68198
		Local sales	04 701885
Ground nuts (shelled)	1 100.00	Heinz/ Selby	0772 265429
	1 200.00	Golden Foods	0734 239533
	1 300.00	Jasbro	09 68198
	1 000.00	Rotvic Foods	04 770739
	Per kg		
Cowpeas	0.40c per kg	Sidela	Gokwe Centre 0775 610567
	400.00 per 1000kg		
Sesame	0.60c per kg	Sidela	0775 610567
	60.00 per 1 000kg		



# Horticultural Activities

	<b><i>GARLIC</i></b>
	<p><b>Soil and Climatic requirements</b></p> <ul style="list-style-type: none"> <li>• Well drained soils with good tilth</li> <li>• Soil pH range is 5.5 to 6.0</li> <li>• Crop is frost hardy</li> <li>• Temperatures of 12 - 16 degrees Celsius , it is best to plant the crop in April to May</li> </ul>
	<p><b>Seed Rate</b></p> <ul style="list-style-type: none"> <li>• 900kg/ ha</li> <li>• Garlic is propagated by segments of bulbs called cloves</li> <li>• Use the biggest clove to obtain vigorous high yielding plants.</li> </ul>
	<p><b>Spacing</b></p> <ul style="list-style-type: none"> <li>• 20cm x 10cm</li> </ul>
	<p><b>Fertilizer Applications</b></p> <ul style="list-style-type: none"> <li>• Compound C at 100kg/ ha</li> <li>• Garlic responds well to organic manure</li> </ul>
	<p><b>Irrigation</b></p> <ul style="list-style-type: none"> <li>• Never allow garlic to run short of moisture</li> <li>• Increase water during bulb enlargement</li> <li>• Cease watering 1 month before harvesting</li> </ul>
	<p><b>Yield</b></p> <ul style="list-style-type: none"> <li>• Expected yield is 6 – 8 tonnes per hectare</li> </ul>
	<p><b>Marketing</b></p> <ul style="list-style-type: none"> <li>• Local Market- OK 70c/kg, Spar 60c/kg</li> </ul>

## PEPPER

	<b>Varieties</b> <ul style="list-style-type: none"><li>• Cal. Wonder</li><li>• Long red cayenne</li><li>• Zorro, Serenade</li></ul>
	<b>Soil Requirements</b> <ul style="list-style-type: none"><li>• Sand, sandy loams preferable for drainage</li><li>• Avoid heavy soils</li><li>• Ideal pH 5.5 to 7.0</li></ul>
	<b>Climatic conditions</b> <ul style="list-style-type: none"><li>• Temperatures of 15 – 20 degrees Celsius for fruit setting</li></ul>
	<b>Seed Rate</b> <ul style="list-style-type: none"><li>• 150 – 200g per hectare</li></ul>
	<b>Spacing</b> <ul style="list-style-type: none"><li>• 75cm x 45cm or 90cm x 45cm</li></ul>
	<b>Fertilizer Requirement</b> <ul style="list-style-type: none"><li>• 1.5m<sup>2</sup> of manure</li><li>• 60kg – 100kg of AN</li></ul>
	<b>Harvesting and Storage</b> <ul style="list-style-type: none"><li>• Harvest commences 2 to 3 months after planting</li><li>• Ripe pepper can be stored at 4.5 – 7 degrees Celsius</li></ul>
	<b>Yield</b> <ul style="list-style-type: none"><li>• Up to 10 tonnes per hectare</li></ul>
	<b>Market</b> <ul style="list-style-type: none"><li>• Local markets, supermarkets and wholesalers</li></ul>

# SMALL LIVESTOCK

## Beef Cattle – Pen fattening

This is done to:

- Increase extra mass before slaughter so as to achieve higher grades
- Profitability is dependent on the cost of the animal, cost of the feed and the feeding period
- The feeding period for older cattle should be between 60–90 days

## Breeds

- Exotic (Bos Taurus)
- Hereford, Angus, Sussex and Simmental

## Characteristics

- Good hybrid vigor is crossed with an indigenous breed
- Good mature sizes

## Essential Facilities

Feeding troughs

- 300mm per head
- 680mm above the hoof level

Drinking troughs

- 100mm trough length per head
- 680mm above hoof level

## Supplements Required

- Protein needed in dry season - roughage
- Energy – early summer – crop residue & hay
- Mineral (phosphorous) – rainy season – salts
- Vitamin- mainly vitamin A

## Feeding supplement forms

- Blocks
- Meals
- Cubes
- Protein/urea/ salt lick

## Examples

- Cotton seed cake
- Sunflower cake
- Soya bean cake
- Maize meal

## Fattening targets guide

Category	Begin Live Mass kg	Feed per animal per day	Days in pens	Total feed (tonnes)	End Lives Mass kg
Heifers	260	11	90	0.99	386
Steers (1.5yrs)	280	11	90	0.99	420
Steers (2.5yrs)	350	12	90	1.08	485
Cull cows	400	14	75	1.05	470

### Beef carcass grading

1. Chiller – super grade
2. Good average quality – choice grade
3. Fair quality – commercial grade
4. X grade – economy
5. Inferior – manufacturing grade

### Marketing

Live mass prices

Abattoirs

Economy - \$1.30/kg each

Super grade - \$1.40/kg

Formal markets - \$1.0/kg

Butchery - \$2/kg

# GOATS

## Breeds

- Indigenous
- Mashona African
- Matebele

## Exotic

- Boer
- Saanen

## Goat housing

- Size should protect goats from droughts, cuds, sun and predators
- Floor should be 1.5m above ground
- Height 3m (to allow ventilation)

## Management

Activity	Management
Buck to doe ration	1:40
Identification	Use horn brands, metal tags
Castration	Knife – 3 weeks and older Burdizoo – at least 3 months Elastrator – 1 to 3 days old
Dipping	Only necessary when goats have ticks or mites
Foot bath	Recommended during rainy season to control foot rot. Use 5% copper sulphate solution (CSS)

## Supplementary feeding

Nutrient	Source
Roughage (bulk feeds)	Maize stalks, rapoko and sorghum stalks, millet and wheat straws
Energy feeds	Maize, sorghum, rapoko grains
Protein feeds	Legume residues – cowpeas, ground nuts, round nuts, velvet beans, sugar beans, browse pods and leaves

### Marketing

- Informal markets
- Private abattoirs and butcheries
- Private slaughters

### Classification of goat carcasses

1. Super
2. Choice
3. Standard
4. Inferior

# INDIGENOUS CHICKENS/ HUKU

## Types

- The naked necks
- Red type
- White and spotted

## Housing

- Water tight roof and properly ventilated
- Predator proof walls
- 0.23cm to 0.28cm space per bird
- Perches for night resting with each bird requiring 20cm space (1m for 5 birds)
- 30cm x 30cm x 30cm nesting boxes (*dendere*) raised 60cm off ground

## Breeding

- Start laying at 20 to 24 weeks
- Cock to hen ration 1:15
- Laying takes 2 weeks or more with an average of an egg per day
- 10– 22 eggs are laid per clutch
- Brooding takes 3 weeks (*kurarira mazai*)
- Hatching is about 80%
- A hen normally runs with chicks for 8 weeks
- A hen's production life is around 3 years

## Supplementary Feeding

- Crushed sunflower, grains, crushed roasted soya bean, vegetable leaves
- Provide clean and fresh water
- Commercial feeds or home made mixes can be given

## Disease Control

- Aerated, clean and dry environment
- Control and treat internal & external parasites
- Vaccinate against New Castle disease and fowl pox
- Monitor for Salmonellosis and Avian Influenza

Name	Principal Symptoms	Treatment	Control
New Castle	Extremely contagious, respiratory problems, greenish diarrhea	None	* Slaughter of sick hens * Destroy carcasses
Fowl Pox	Eyelids wattles, false membranes on mouth	Antiseptics Vitamin A & D	Systematic vaccination
Coccidiosis	Hemorrhagic diarrhea	Antibiotics Terramycin Terranox	Disinfection of house

### Marketing

- Sell as live or dressed birds
- Average of \$5 to \$6 per bird



## ***GUINEA FOWL***

### **Breeding**

- These are seasonal breeders
- Breed between 6–8 months of age
- Breeding starts around September and round off around March
- They lay 90–210 eggs per season

### **Egg Collection**

- Leave 2–3 eggs in the nest when collecting
- Keeps eggs in cool dry place with good ventilation

### **Housing**

- Grass roof or iron sheets on wood and wire mesh
- Keep keets indoors for first month
- Use brooding cages to keep keets warm
- Feeding
- Use mainly cereal grains and pulses
- Grasshopper, termites, while ants are additional feeding

### **Marketing**

- Sell as live or dressed birds or fresh eggs

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