

# RESULTS OF RESEARCH DESIGN, MANUFACTURE AND TESTING OF MAIZE SEEDING-MACHINE FOLLOWING MINIMUM TILLAGE METHOD IN CLIMATE CHANGE REGIONS

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*Presentation by*

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# 1. Introduction

Land Area	330,951sqkm
Capital City	Hanoi
Population	87,262,356
Language	Vietnamese (official),
Religion	Buddhism, and Catholic.
Climate	North Vietnam has Southern Mediterranean type climate. South Vietnam has a tropical monsoon climate.
Local Time	GMT +7
Currency	Vietnamese Dong (VND)
<b>Agriculture produces:</b>	<i>Rice</i> , maize, <i>coffee</i> , tea, cashewnut, rubber, <i>fishesies</i> , shrimp, ..

# 1. Introduction

**-Agricultural production land: 10.151.100 ha**

**-Forestry land: 15.373.100 ha**

**-Specially used land: 1.846.800 ha**

**-Homestead land: 690.900 ha**

**-Unused land: 3.074.000ha**

*(Statistical Yearbook of Vietnam, 2012)*

# 1. Introduction

## **Climate (World Atlas)**

Vietnam locates between 8° 30' to 23°22' latitudes in the north tropic latitudes; therefore it belongs to the tropical area. **Climate in**

**Vietnam is mostly warm all the year recently.**

The southern is full with sunshine; the northern part is also covered with eve sunny months.

Average air temperature is 22° - 28° C but this air temperature in a year is quite different between the north and south region.

**The southern is characterized by two seasons, a wet season from May to October and a dry season for the rest of the year.**

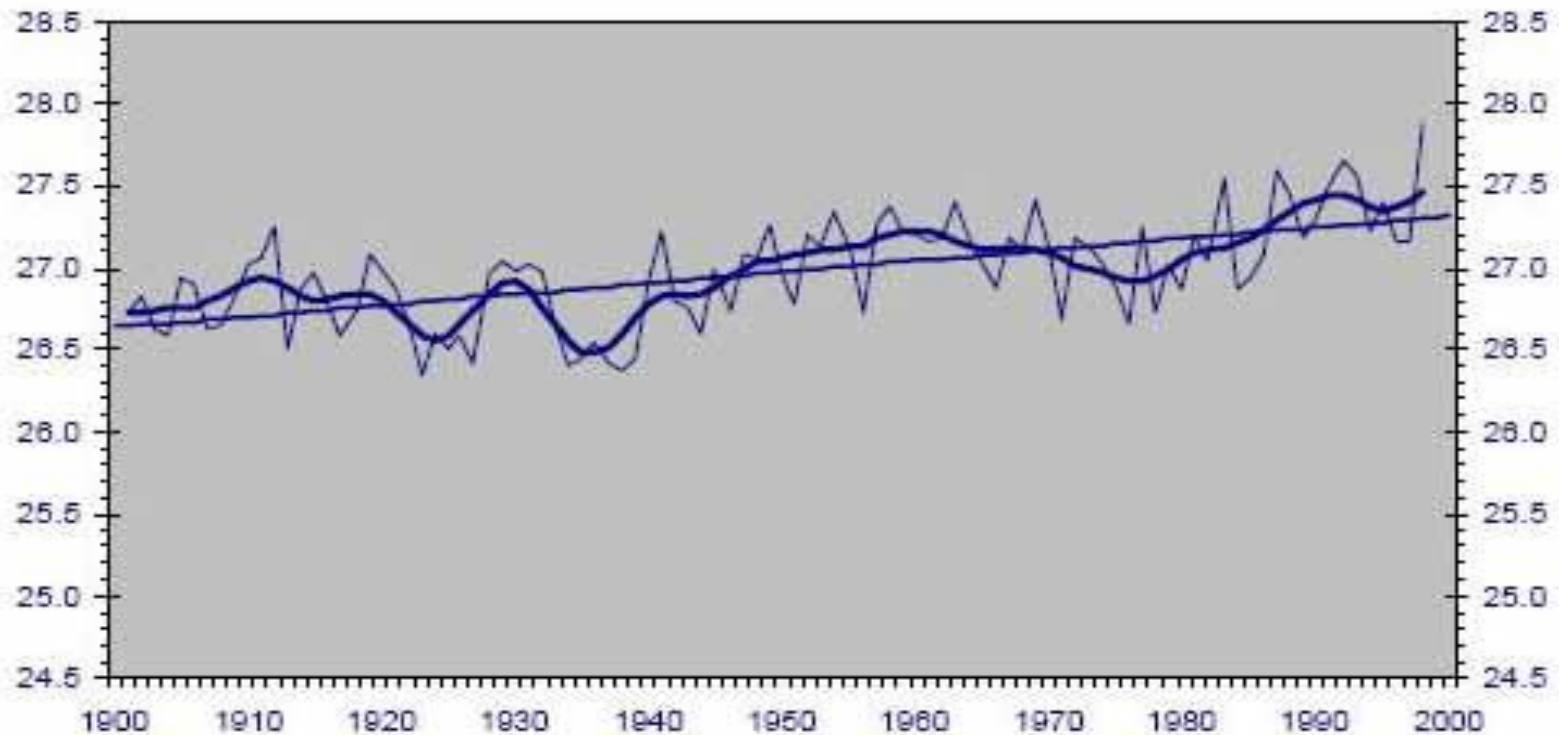
**The northern has four seasons summer, autumn, winter and spring separately. Average air humidity reaches to 70%-80%, and average of rainfall is about 1500-2000 mm some high mountainous areas could the over 2500-3000 mm a year as. Annual rainfall, frequently causing floods.**

# 1. Introduction

Climate in Vietnam is mostly warm all the year recently.

Analysis of climate change in Vietnam- Temperature

Vietnam Summer Temperature, 1901-1998



Source: <http://www2.hcmuaf.edu.vn/contents.php?ids=5992&ur=pvhien&lng=vn>

Schaefer, Dirk. 2003. German Vietnam Seminar. Hanoi, October 27-30, 2003.

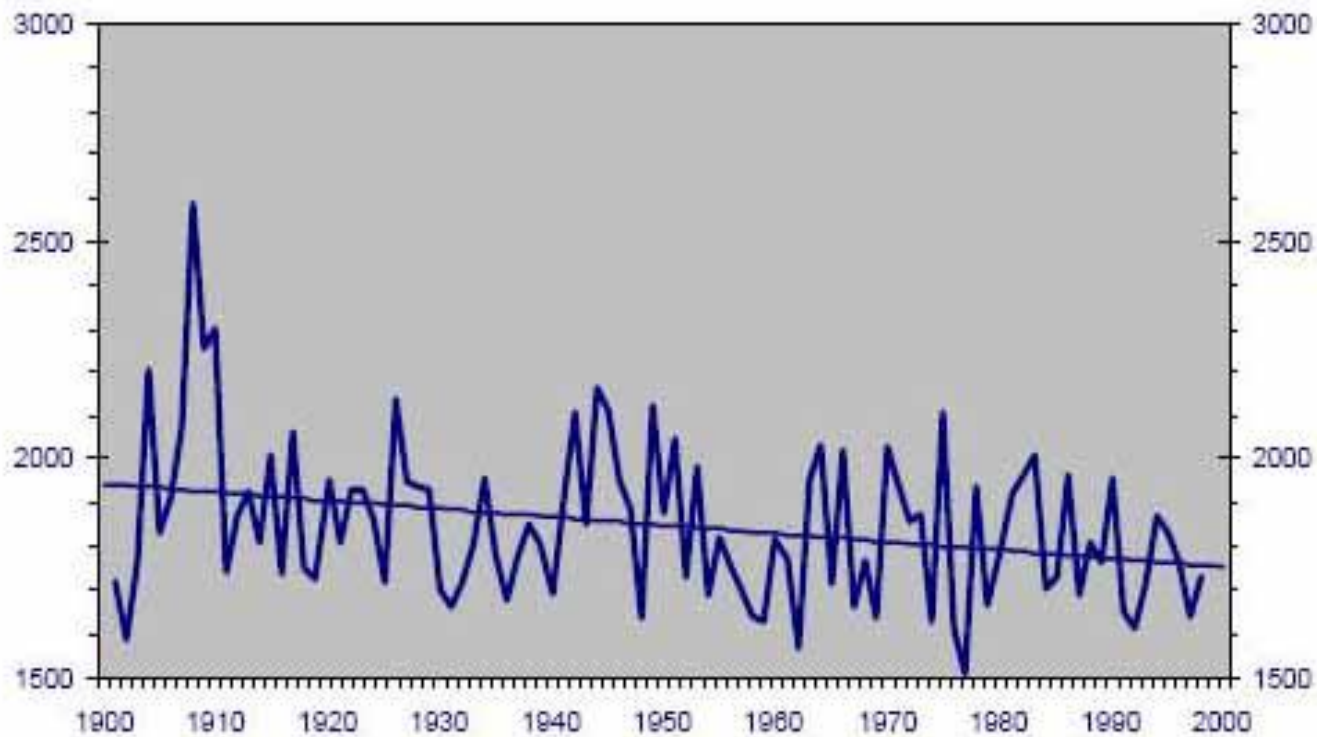
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# 1. Introduction

Climate in Vietnam is mostly warm all the year recently.

Analysis of climate change in Vietnam - Precipitation

Vietnam Annual Precipitation, 1901-1998





## 2. CLIME CHANGE

Northern



Whole 2015, natural disasters:

Killed 154 people dead, 127 injured,  
1,242 houses collapsed, gone;  
35,233 houses were flooded, damaged, roofs;  
445 110 hectares of rice and crop damage;  
millions m3 of rock transportation,  
irrigation landslides and sedimentation ...

Estimated total damage by natural disasters **around 8114 billion VND**, which mainly focus on agricultural crop damage, erosion of roads, irrigation, power supply systems, telecommunication, mining, ...

Source: <http://vietnamnet.vn/vn/kinh-doanh/nam-2015-thien-tai-lam-thiet-hai-hon-8-100-ty-dong-283378.html>

Southern





## 2. CLIME CHANGE



### Northern

Up to May 2016

The agricultural sector heavily damaged: estimated loose 400 billion VND

\* with 52,000 cattle died,

\* 150,000 ha of rice died,

<http://www.vtc.vn/ret-lanh-di-vao-lich-su-o-mien-bac-nhung-con-so-biet-roi-nuoc-mat-d241761.html>

### Southern





## 2. CLIME CHANGE

Northern



2016

*\* May/2016 to 22/63 provinces have been affected by drought and invasive mangrove especially 9 provinces in the Mekong Delta*

*\* 288 259 households lack water for life;*

*Losses: of up to 249 944 ha of rice;*

*18 960 hectares of crops,*

*fruit trees, 30 522 ha,*



the middle



Southern



## 2. CLIME CHANGE

Northern



2016

*\* Vietnam loosen more than 15.000 billion VND because of the drought, invasive mangrove history  
Lost: more than 800. 000 tan rice*

Source: <http://kinhdoanh.vnexpress.net/tin-tuc/vi-mo/viet-nam-mat-15-000-ty-dong-vi-han-han-xam-ngap-man-lich-su-3412052.html>



the middle

Southern





## 2. CLIME CHANGE



the middle

\* Why ?

• Clime change?

-----Required done some thing to reduce impact of nature disaster.

There are many reasons for climate change

We are done agricultural,

Southern



### 3. Solutions for Agriculture

Vietnamese Government has policies

\* Decision

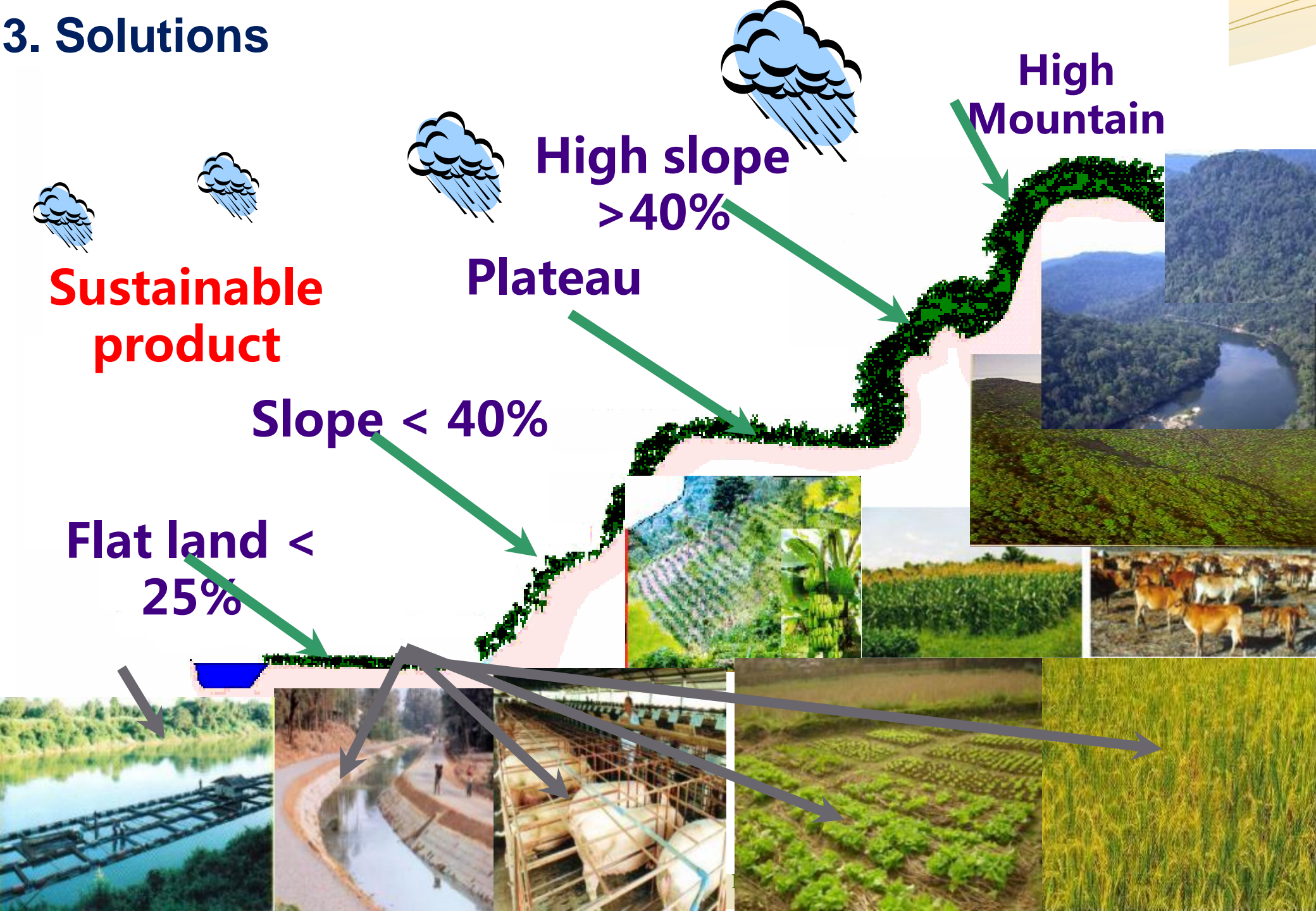
APPROVAL SCHEME AGRICULTURAL SECTOR  
**RESTRUCTURING PLANS** FOR ENHANCING BY VALUE  
ADDED AND **SUSTAINABLE DEVELOPMENT**

Number **899/QĐ-TTG**

***signed June 10, 2013*** By the Prime Minister - the Socialist  
Republic of Viet Nam



# 3. Solutions





# 3. Solutions



- Minimum mechanical soil
- Permanent organic soil cover.
- Diversification of crop species grown in sequences and/or associations.

<http://www.fao.org/ag/ca/1a.html>

Conservation agriculture systems



Minimum mechanical soil disturbance



Permanent organic soil cover

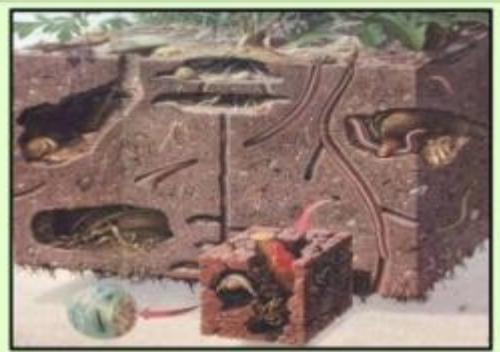


Diversified crop rotations including cover crops

(retention of adequate levels of crop residues on the soil surface)

(to help moderate possible weed, disease and pest problems)

Reminder – A healthy soil is a living biological system



## 2. Conservation Agriculture (CA)



# 3. Solutions

## Conservation Agriculture

Farmer Field School participants harvesting no-till IPM potatoes in lowland rice production systems, Thai Binh, Vietnam, 2011



### 3. Solutions



**The whole**

**Mekong Delta region has 112 thousand hectares conversion spring-summer rice production to other crops such as corn, dragon, black sesame, chili, pineapple ...,**



**partly to meet demand market, increased economic efficiency compared to rice and the reduce effects of lack water**

<http://iasvn.org/tin-tuc/Chuyen-doi-co-cau-cay-trong-o-Dong-bang-song-Cuu-Long-7207.html>

### 3. Solutions

#### Maize area Increased

	Đơn vị	2015	2016 (ước tính)	2017 (dự báo)
Area	nghìn ha	1.179	1.300	1.300
capacity	tấn/ha	4,48	4,6	4,8
yield	nghìn tấn	5.281	5.980	6.240

#### Total maize import Reduce

Time	From May 2013 to May 2014		From May 2014 to February 2015
USA	253.268	USA	263.039
<b>Quốc gia khác</b>		<b>Quốc gia khác</b>	
India	771.630	Ấn Độ	329.156
Brazil	927.679	Brazil	744.161
Thái Lan	198.491	Thái Lan	10.623
Ác-hen-ti-na	141.290	Ác-hen-ti-na	477.853
Lao	25.903	Lào	3.636
Cambodia	62.850	Căm-pu-chia	18.750
<b>Other countrys</b>	2.381.111		1.584.179
Các quốc gia khác ngoài các nước trên	17.515		28.000
<b>Total</b>	2.398.626		1.875.218

Source: Ministry of Agriculture and Rural Development

<http://www.vietrade.gov.vn/nong-sn-khac/5720-tinh-hinh-san-xuat-mat-hang-ngo-cua-viet-nam-nam-2016-va-du-bao-nam-2017.html>



# 3. Solutions

## Conservation agriculture



# 3. Solutions

## Conservation agriculture machines

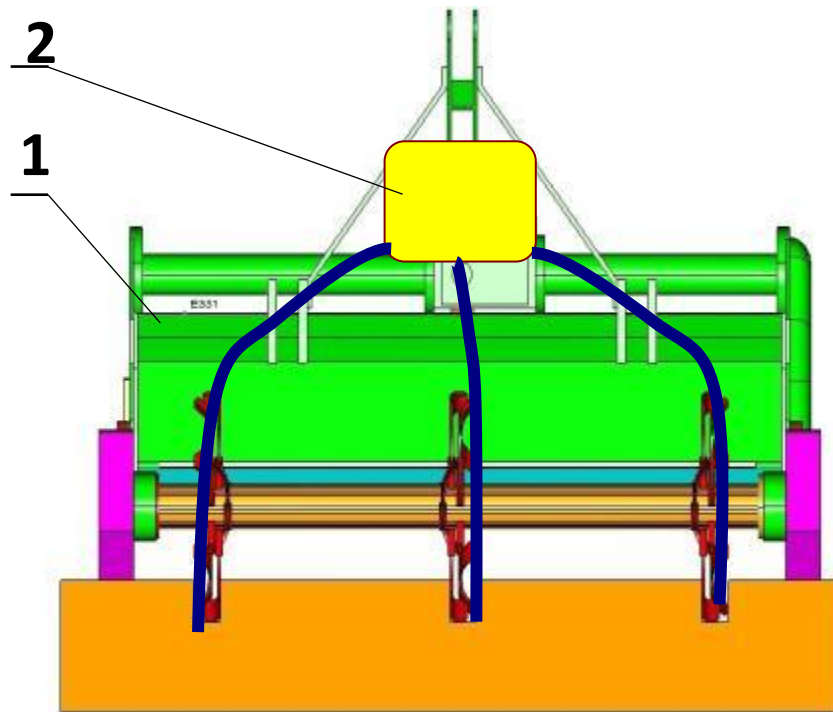




# 4. Research, design and manufacture

Not detail

Minimum mechanical soil, reduce time tractor done



1- Rotary part  
2- Seeder part

Figure Maize seeder machine

## Technical requirements

Corn sowing models under the minimum tillage work machine

- **Capacity: 0.2÷0.3 ha/h.**
- **Soil is made small in a position sowing seed (80% soil reached 3÷5 cm of thickness)**
- **Number of rows planted: 3 rows**
- **Distance row sowing (cm) 60 ÷ 80**
- **Distance between 2 planter: 25 ÷ 30 cm**
- **Tractor link 30 ÷ 35 HP**

# 5. Testing maize seed machine

## - Methodology

- Laboratory lay-out methods (field preparation)

- Testing and evaluation of maize seed machine was done according to the RNAM, (1985) standards; TCVN 2005

## - Data processing and analysis

The data were summarized, tabulated and analyzed with help of Microsoft Excel and SPSS.



## - Instruments and equipment used for testing machine

### *Test conditions.*

## 5. Testing maize seed machine

- Methodology
- Instruments and equipment

### - *Test conditions.*

- Experiment on the field in Gia Lam district,
- 3 pots, each pot have **sizes is 30 m x 60 m (1800m<sup>2</sup>)**

Data were taken at random, but need far from edge of field more than 10 meter,



# 5. Testing maize seed machine

## 5.3. RESULTS AND DISCUSSION

STT	Structure of machine	Đơn vị	Giá trị thông số
1	Overall dimensions (LxWxH)	mm	1850×1880×970
2	Width of work	mm	1600
3	Total blades rotary	Chiếc	18
4	Type blades		Lưỡi cong
5	Number of group blade	cụm	3
6	Number of blades each group	lưỡi	6
7	Width work of blades cluster	mm	200 ÷ 210
8	Top blade diameter of rotary	mm	480
9	Structural adjustment of rotary depth	-	quay ren vít
10	Transmission structure for rotary	-	Bánh răng, xích
11	Type of sowing division	mm	kiểu đĩa nghiêng
	Diameter of disc sowing	lỗ	180
	Number of holes in the seeding disc	mm	8
	Fire particle diameter	mm	10, 11, 12
	The thickness of the disc	Độ	8
	The tilt angle of the disk sowing	cụm	25÷45
	Number of Sower clusters		3

# 5. Testing maize seed machine

## 5.3. RESULTS AND DISCUSSION

12	<i>Wheel transmission</i> <i>Dimension of wheel</i> Wheel width Height lugs cling Transmission chain $Z_1 = 28, Z_2 = 14$ Bevel gear pair: $m = 3, Z_1 = 16, Z_2 = 16,$ Length of teeth $b = 30$ mm	mm mm mm	330 100 30 $t = 12.7$
13	<i>Slitting groove parts</i> <i>Land separating angle</i> <i>Slitting blade height</i>	Độ mm	Kiểu dao rạch 15÷0 150
14	<i>Pipe nuts</i> <i>Type, type</i> <i>Diameter pipe</i>	- mm	Nhựa mền, trong 21
15	<i>Soil compression unit</i> <i>Diameter D</i> <i>Width B</i>	mm mm	200 100
16	The volume of container seed	kg	10
17	Style link with tractor	-	Kiểu treo
18	Capacity tractor	Hp	25÷35

## 6. Conclusions of testing



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## 6. Conclusions of testing

Prototype maize seeding-machine follow minimum tillage method (GNTT-0,25) will be well condition support for developing Conservation Agriculture in Vietnam. Best difference of GNTT-0,25 machine when compare with another seed drills machine is GNTT-0,25 machine don't need soil tillage before sowing the seed. GNTT-0,25 machine will be done limit tillage and direct sowing seed together in one time operation; GNTT-0,25 machine attach with tractor by three point linkage, capacity of tractor is 25 ÷ 35 Hp. Specifications of GNTT-0,25 machine: Capacity: 0,25 ha/h; Number of row: 3 rows; Distance between 2 rows: 65 cm; Distance between 2 planter: 25 ÷ 30 cm, Missing seed: < 3%; Non injure seed



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# Thank you.

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