



01 中国玉米种植现有机械化水平 Current Mechanization Level of Maize Planting

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Equipment of Whole Process Mechanization of Maize Production

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Development trend and technology prospect





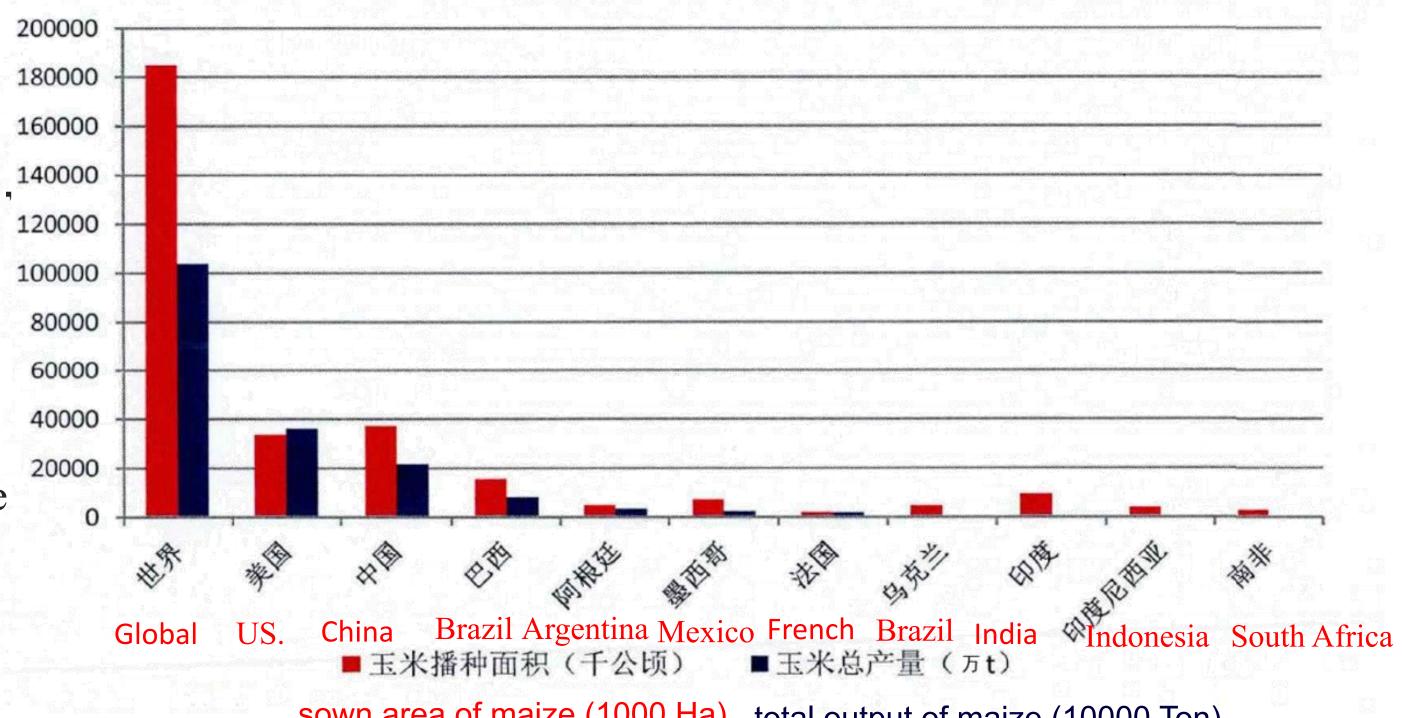




#### 种植面积与产量 Planting area and yield

玉米是中国第一大粮食品种,占粮食种植面积的42%。2019: 1,140000 中国玉米产量2.57亿吨,消费量为2.75亿吨,进口量448万 出口量2万吨,进口占消费比为1.63%,进口依赖度低。 中国、美国和巴西是世界排名前三的玉米种植大国。

Corn is China's largest grain variety, accounting for 42% of the grain planting area. In 2019, China's corn output was 257 million tons, consumption was 275 million tons, imports were 4.48 million tons, and exports were 20,000 tons. Imports accounted for 1.63% of consumption, and import dependence was low. China, the United States and Brazil are the world's top three corn growing countries.

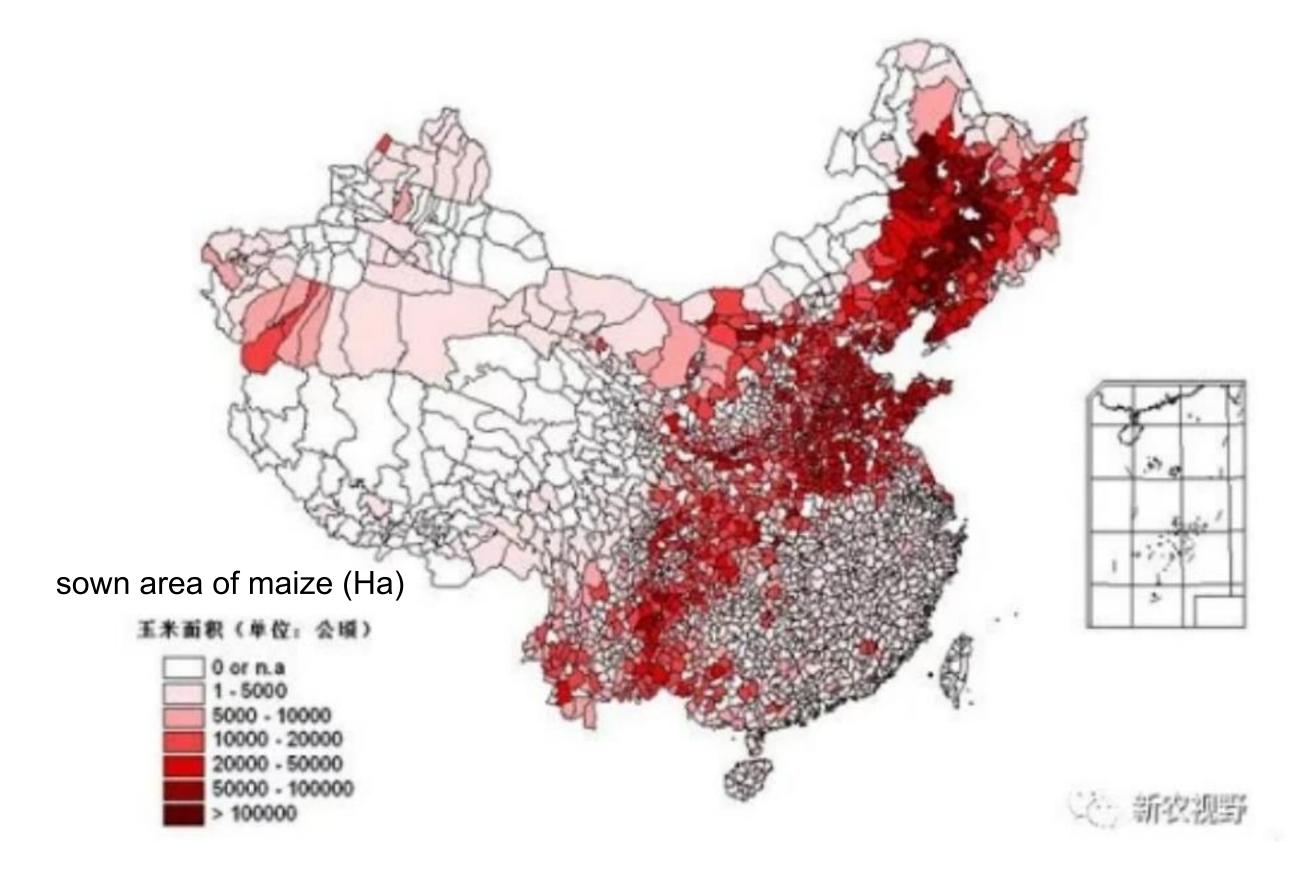


sown area of maize (1000 Ha) total output of maize (10000 Ton)

2014年玉米主产国种植面积和产量对比图 Comparison of planting area and yield in major corn producing countries in 2014

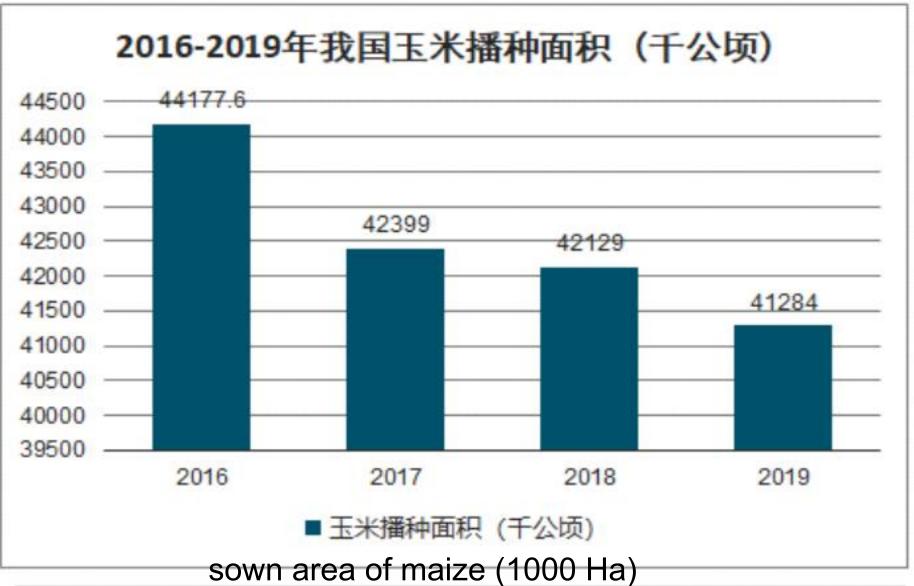
## 玉米种植现状 Current situation of core planting

种植面积与产量 Planting area and yield



中国玉米种植地区分布 Distribution of corn planting in China

2016-2019 sown area of maize in China (1000 Ha)





total output of maize (10000 Ton)



#### Current situation of core planting



#### 玉米全程机械化作业

Whole Process Mechanization of Maize Production









耕整地 Tillage

播种 Sowing

田间管理 Field management

收获 Harvest

截至 2018 年,中国玉米耕、种、收及综合机械化率分别达到97.33%、88.73%、75.85%、88.31%。2019年,玉米 机耕率预计达到 97.8% 左右,;机播率预计超过90%;机收率预计超过 80%;综合机械化率预计超过 90%。

As of 2018, China's corn cultivation, planting, harvesting and comprehensive mechanization rates have reached 97.33%, 88.73%, 75.85%, and 88.31% respectively. In 2019, the mechanical cultivation rate of corn is expected to reach about 97.8%; the mechanical sowing rate is expected to exceed 90%; the mechanical yield is expected to exceed 80%; the comprehensive mechanization rate is expected to exceed 90%.



Current situation of core planting



### 耕整地环节 Tillage









旋耕作业 Rotary tillage

铧式犁深翻耕 ———

———— 圆盘耙、钉齿耙碎土
→ Disc harrow, nail-tooth harrow for soil

过去长期单一旋耕整地方式,导致了土壤"耕层浅、犁底层厚"以及玉米"不耐旱、不抗涝、不抗倒"等问题,铧式犁翻耕、深松、松耙组合等轮耕作业面积逐年扩大,对改善土壤质量和作物增产起到了明显的推动作用。

Deep plowing —

The long-term single rotary tillage method of land preparation resulted in the problems of "shallow plough layer and thick plow layer" and "intolerance of drought, waterlogging, and lodging" of corn. Combination of plowing, deep loosening and loose harrowing The area of such rotation farming operations has expanded year by year, which has played a significant role in improving soil quality and increasing crop production.



#### Current situation of core planting



#### 播种环节 Sowing





精量播种面积进一步扩大,播种质量有一定提升。东北、华北一熟区和黄淮海两熟区玉米精量播种方式已占据主导地位,播种质量有所提升,尤其是免耕精量播种技术发展迅速。

The precision planting area has been further expanded, and the planting quality has been improved to a certain extent. The precision sowing methods of corn in Northeast, North China and Huanghuaihai two-cropping areas have occupied a dominant position, and the seeding quality has been improved, especially the rapid development of no-tillage precision seeding technology.









高地隙植保机械在大田生产中得到了广泛应用,无人机植保技术发展迅速,2014年全国无人植保机695架,到2018年全国无人植保机已达2.3万架,作业面积约3亿亩。但植保无人机仍然存在承载不足、续航能力弱等问题。 High ground gap plant protection machinery has been widely used in field production. UAV plant protection technology has developed rapidly. In 2014, there were 695 unmanned plant protection machines nationwide. By 2018, the number of unmanned plant protection machines nationwide has reached 23,000, with an operating area of about 300 million. mu. However, plant protection UAVs still have problems such as insufficient carrying capacity and weak endurance.





#### 收获环节 Harvest



中国玉米机械化收获以果穗收获为主,籽粒直收占比不足10%。果穗收获时,要求有剥皮、秸秆还田等功能,并对苞叶剥净率有较高要求。

China's mechanized corn harvesting is dominated by ear harvesting, and direct grain harvesting accounts for less than 10%. When the ears are harvested, they are required to have functions such as peeling and returning the straw to the field, and have higher requirements for the removal rate of bracts.



#### 玉米机械化存在问题 Problems in maize mechanization

我国南北地貌差距大,不同区域的经济水平和气候条件差距大。适宜机械作业地区和经济较发达区域,农民收入中对农业机械的购买投 入较多,玉米机械化业生产发展速度相对较快;而经济欠发达的地区先进适用机具保有量少,玉米机械化生产的发展速度慢。

There are large differences in landforms between North and South in my country. There are also large differences in economic levels and climatic conditions in different regions. The cost on agricultural machinery accounts for more of the income of farmers in areas suitable for mechanical operations and economically developed areas, where the production of corn mechanization is developing relatively fast. However, in areas where the economy is underdeveloped, there are few advanced and applicable machines. The development of mechanized corn production is slow.

2 装备结构不合理 Unreasonable Equipment Structure

我国大中型以上拖拉机(14.7kW以上)的农机具配套比为1:1.7,与1:3的合理 配套比有一定差距。其中,高性能的植保机具、籽粒收货机具保有量少,限制 了玉米产量提升。

The matching ratio of agricultural machinery for large and medium-sized tractors (above 14.7kW) in my country is 1:1.7, which is far behind the reasonable matching ratio of 1:3. Among them, high-performance plant protection equipment and grain receiving equipment have a small inventory, which limits the increase in corn output

Small Farmers Cultivation 4 小农户种植方式 ■

小规模农业经营一直是我国主要的农业经营方式,单一农户购买农机具是一 件困难的事,尤其玉米收获机械属于大型较贵的机具。

Small-scale agricultural operation has always been the main agricultural operation method in China. It is difficult for a single farmer to purchase agricultural machinery, especially corn harvesting machinery is a large and expensive machine. 3 农机农艺分离 ■

Separation of Agricultural Machinery and Agronomy

我国不同地区的育种、耕作、种植方式都不尽相同。会出现不在 机具调整范围内的种植方式, 使得机械无法使用。

In China, breeding, farming, and planting methods in different regionsare not the same. If the planting method is not within the adjustment range of the machine, the machine cannot be used.

Machine Quality Need to Be Improbed 5 机具质量有待提高 ■

我国部分国产的设备技术落后,可靠性差。高端产品多需要 从外国进口,造成价格高,不利于农机具普及。

Most high-end products need to be imported from abroad, resulting in high prices, which is not conducive to the popularization of agricultural machinery.

The Initial Stage of Agricultural Machinery Socialized Service

我国农机服务合作社属于刚起步阶段,大部分合作社规模较小,未能形成全产业的服务能力。辐射带动能力弱,抗风险能力弱,管理不够科学规范, 组织化与专业化程度低,经营者素质普遍较低,服务观念与日益发展的现代化农业需求不匹配。

Agricultural machinery service cooperatives are in their infancy. Most of the cooperatives are small in scale and fail to form the service capacity of the whole industry. The ability to drive radiation and the ability to resist risks are weak. Their management is not scientific and standardized. The degree of organization and specialization is low and the quality of operators is generally low. The service concept does not match the growing modern agricultural needs.





# 玉米全程机械化生产环节

#### The Whole Mechanized Production of Maize



耕地为传统农艺,松土方便播种。但近年开始流行玉米免耕播种机,简化了生产流程。

The maize no-till seeder simplifies the production process.



The corn no-tillage machine eliminats the need for cultivation and fertilization.





玉米免耕机,由开沟器直接开沟,种药同步播种,省去耕地、施肥等流程。



植保机械臂展可达3-5米,单次面积大,免去重复劳动,提高生产效率。

# Management

The plant protection machinery has an arm of 3-5 m, eliminating repeated labor and improving production efficiency.



Large maize grain harvester can complete maize ear harvest and straw crushing and returning to the field.

大型玉米籽粒收获机,可单次收获多笼。可同时完成玉米果穗收获和秸秆粉碎还田等步骤。

## 玉米全程机械化生产环节

The whole mechanized production of maize



耕整地 Land preparation



田间管理 Field management

3



收获 Harvest



烘干、耕地还田 Drying, straw returning



播种



#### 有机肥施肥设备——中型 Medium-sized organic fertilizer application equipment

## 推荐机型 Model recommendation







为补充土壤肥力和改善土壤有机质含量,在每年的翻耕之前,都会撒施有机肥。一般施农家有机肥通常以立方米计算。根据不同作物种类的对有机肥的需求 施肥量也不尽相同,一般为3~5立方米。科学的方法是现代的测土配方施肥技术,即节约成本,又能提高肥料的利用率,使作物高产、优质、高效生产。

In order to supplement soil fertility and improve soil organic matter content, organic fertilizers are sprinkled before plowing each year. The general application of farmhouse organic fertilizer is usually calculated in cubic meters. According to the demand for organic fertilizer of different crop types, the amount of fertilizer is not the same, generally 3 to 5 cubic meters. These are all empirical fertilization methods. What is more scientific is the modern soil testing formula fertilization technology, which saves costs and improves the utilization rate of fertilizers, so that crops are produced with high yield, high quality and high efficiency.

#### Model recommendation

中型施肥设备 Medium-sized fertilizer equipment



10 to 10 to

中型撒肥设备 (需配套动力设备)

Medium-sized fertilizer equipment (Need supporting power equipment)

撒肥机

技术参数

肥料物态: 厩肥、粪肥、有机肥、颗粒

外形尺寸: 4400\*2300\*2400 (mm)

施肥形式: 铺洒

作业形式:全自动

施肥量: 1000kg/亩

单次装肥量: 6-10吨

效率: 10hm/h以上

参考价格: 2.5万元

Manure spreader

**Technical Parameters** 

Fertilizer state: manure, manure,

organic fertilizer, pellet

Dimensions: 4400\*2300\*2400 (mm)

Fertilization form: spread

Work form: Fully automatic

Fertilization amount: 1000kg/mu

Single fertilizer load: 6-10 tons

Efficiency: more than 10hm

Reference price: 25,000 yuan

颗粒肥、化肥撒施设备 Pellet fertilizer, chemical fertilizer spreading equipment







玉米拔节前需要进行中耕除草和追肥,肥料是颗粒状化肥为主,一般在灌溉或者下雨前,撒到地表,遇水溶解后,渗入土壤被玉米根系吸收。每公顷一般追施化肥450-750千克。

Before jointing corn, weeding and top dressing are required. Fertilizers are mainly granular chemical fertilizers. Generally, they are sprayed on the ground before irrigation or rain. After being dissolved in water, they will penetrate into the soil and be absorbed by the corn roots. Generally, 450-750 kg of chemical fertilizer is applied per hectare.

Model recommendation

#### 颗粒肥中大型型施肥设备

#### Large size fertilizer equipment





双圆盘离心撒肥机

技术参数

肥料物态: 颗粒

外形尺寸: 1600\*1600\*1400 (mm) Dimensions: 1600\*1600\*1400 (mm)

撒肥幅宽: 10-20m可调

挂接形式:三点悬挂

作业速度: 1-1.8m/s

作业效率: 1.8-6.8hm/h

参考价格: 5000元

Double disc centrifugal fertilizer spreader

**Technical Parameters** 

Fertilizer state: Pellet

Spreading width: 10-20m adjustable

Work form: Fully automatic Fertilization

Mounting form: three-point Working

speed: 1-1.8m/s

Operating efficiency: 1.8-6.8hm/h

Reference price: 5,000 yuan

#### Model recommendation

#### 颗粒肥小型施肥设备

#### Small fertilizer equipment







推车式撒肥机

技术参数

肥料物态: 颗粒

外形尺寸: 1200\*500\*1200 (mm)

施肥幅宽: 3000-5000 (mm)

作业形式: 半自动

施肥效率: 0.3-0.5hm/h

参考价格: 300元

Cart type fertilizer spreader

**Technical Parameters** 

Fertilizer state: granular

Dimensions: 1200\*500\*1200 (mm)

Fertilization depth: 30-50 (mm)

Work form: semi-automatic fertilizer rate:

80-120kg/mu

Reference price: 300 yuan

推车式撒肥机 Cart type fertilizer spreader

推车式撒肥机 Cart type fertilizer spreader

### Model recommendation

#### 中型耕地设备 Middle tillage equipment



铧式犁主要适用于农田耕地灭茬,破除地表板结,秸秆切碎还田,耕后碎土。铧式犁作业效率高,入土碎土能力强,耙后地表平整,对粘重土地、荒地和杂草多的地方具有很强的通用性。主要有一下两个特点:

- 1、犁尖采用垂直斜插式,减少了犁铧入土的阻力,能顺利实现深耕。
- 2、犁铧整体与牵引方向成45度夹角,有利于铧式犁的翻 土碎土,并能将地表的杂草深埋,保持土壤水分,每季进 行深耕可不断改善土壤质量,平衡土壤酸碱值,保墒蓄水。

The split plow is mainly suitable for stubble removal in farmland, breaking the surface compaction, chopped straw and returning to the field, and crushing the soil after ploughing. The split-type plow has high efficiency, strong ability to crush the soil, and the ground surface after harrowing is smooth, and it has strong versatility for heavy soil, wasteland and places with many weeds. There are mainly two characteristics:

- 1. The plow tip adopts a vertical inclined insertion type, which reduces the resistance of the ploughshare into the soil and can smoothly realize deep ploughing.
- 2. The overall ploughshare and the traction direction form an angle of 45 degrees, which is conducive to plowing and breaking the soil, and can bury the weeds on the surface deeply to maintain soil moisture. Deep ploughing every season can continuously improve the soil quality and balance the soil. PH value, preserve moisture and store water.

铧式犁

技术参数: 右表

参考价格: 1万元(4行)

Plow

Technical parameters: right table

Reference price: 10,000 yuan (4 lines)

Working width

Tillage depth

Number of plows

Weight

Supporting power

Hooked method

	耕幅 (mm)	400	600	800	1000	500	750	1000	1250
<u> </u>	耕深 (mm)	200~250							
	犁体数量	2	3	4	5	2	3	4	5
	重量 (kg)	64	100	130	170	125	170	240	270
•	配套马力 (hp)	15~25	25~35	35~45	50~60	25	40	50	65
	挂接方式	三点悬挂 Hooked by three points						points	

#### Model recommendation

中型耕地设备 Middle tillage equipment



翻转犁

技术参数: 右表

参考价格: 3万元(4行)

Flip plow

Parameters: right table

Reference price: 30,000 yuan

(4 lines)

翻转犁实际为上下铧式犁组合,利用液压进行旋转,实现单行作业完毕不必再回到起始侧再进行耕地。主要有以下特点:

- 1、翻转犁整体采用组合式,便于维修和更换易损件。犁铧上下犁均采用螺栓装配,降低了维修保养的成本。
- 2、翻转犁采用液压翻转,可提高翻转效率和翻转稳定性,减少撞击对拖拉机和犁造成的伤害。
- 3、采用三点悬挂的连接方式,方便调节耕深,工作稳定,翻垄平整。
- 4、重型翻转铧式犁整机重量在1000公斤以上,能满足铧式犁在大马力拖拉机下的高强度高负荷的工作。

Boundary dimension	Supporting power	Weight	Working width	Number o	
外形尺寸 (mm)	配套动力 (kw)	重量	工作宽幅	犁体数	
2000*1150*1260	50	400	90	3	
2560*1400*1260	80	450	120	4	
3020*1550*1280	100	590	150	5	

The flip plow is actually a combination of up and down plows, which are rotated by hydraulic pressure, so that after the single-row operation is completed, there is no need to return to the starting side to cultivate the land. Mainly have the following characteristics:

- 1. The turning plough adopts a combined type as a whole, which is convenient for maintenance and replacement of wearing parts. Both the ploughshare and the upper and lower ploughs are assembled by bolts, which reduces the cost of maintenance.
- 2. The turning plough adopts hydraulic turning, which can improve turning efficiency and turning stability, and reduce the damage to tractor and plough caused by impact.
- 3. The three-point suspension connection method is adopted to facilitate the adjustment of the tillage depth, the work is stable, and the ridge turning is smooth.
  - 4. The weight of the heavy-duty flip-type plow is more than 1,000 kg, which can meet the high-intensity and high-load work of the plow under the high-horsepower tractor.

小型耕地设备 Mini tillage equipment





手持翻地机

技术参数

动力:汽油

外形尺寸: 主耕地杆1500 (mm) Dimensions: main arable

耕幅: 150 (mm)

耕深: 50-150 (mm)

效率: 2(亩/小时)

参考价格: 2000元

Hand-held turning machine

**Technical Parameters** 

Power: Gasoline

land pole 1500 (mm)

Tillage width: 150 (mm)

Tillage depth: 50-150 (mm)

Efficiency: 2 (mu/hour)

Reference price: 2000 yuan

手持耕地设备 Handheld tillage equipment

#### Model recommendation

小型耕地设备 Mini tillage equipment



手扶式翻地机 技术参数

动力: 单缸柴油机(8kw)

外形尺寸: 2170\*845\*1150 (mm)

耕幅: 800-1200 (mm)

耕深: 150-300 (mm)

效率: 10-15 (亩/小时)

参考价格: 8000元

Walk-behind turner

**Technical Parameters** 

Power: single cylinder diesel

engine (8kw)

Dimensions: 2170\*845\*1150 (mm)

Tillage width: 800-1200 (mm)

Tillage depth: 150-300 (mm)

Efficiency: 10-15(mu/hour)

Reference price: 8000 yuan

小型耕地设备 Small tillage Equipment

#### 小型播种设备 Small sowing equipment



手动播种器 Hand-held planter

推车式播种器有五锥、六锥和七锥三种款式,对应株距分别为36.3cm,30cm和25cm满足不同地区和农户的要求。

提式播种器自动化程度更低,也不适合在土壤过硬或者过湿的土地上使用,但使用方便,不单可以进行玉米播种,也可以用作大豆、棉花等穴播作物的播种设备,效率明显高于纯人力,可达到7(亩/天)左右

The cart-type planter has three styles of five cones, six cones and seven cones. The corresponding plant spacing is 36.3cm, 30cm and 25cm to meet the requirements of different regions and farmers.

The lift-type planter has a lower degree of automation. It is not suitable to use on hard or wet land, but it is easy to use. It can not only be used for corn planting, but also can be used as a planting equipment for soybean, cotton and other hole planting crops. The efficiency can reach about 7 (mu/day), which is obviously higher than manpower.

#### 小型播种设备 Small sowing equipment



两行播种机(需配套动力) two-row planter (supporting power required)

小型两行播种机

技术参数

配套动力: 12kw拖拉机

外形尺寸: 1350\*1100\*995 (mm)

种箱容积: 2\*7(L)

肥箱容积: 78(L)

效率: 2-5(亩/小时)

参考价格: 5000元

Small two-row planter

**Technical Parameters** 

Supporting power: 12kw tractor

Dimensions: 1350\*1100\*995 (mm)

Seed tank volume: 2\*7 (L) Fertilizer

tank volume: 78 (L)

Efficiency: 2-5 (mu/hour)

Reference price: 5000 yuan

#### Model recommendation

#### 中型播种设备 Midium sowing equipment





四行免耕播种机

技术参数

配套动力: 90kw拖拉机

外形尺寸: 2060\*1280\*900 (mm)

行距: 400-650 (mm)

种箱容积: 21(L)

肥箱容积: 82(L)

播种深度: 40-60 (mm)

施肥深度: 60-80 (mm)

效率: 4-8 (亩/小时)

参考价格: 7万元

Four-row no-tillage planter

**Technical Parameters** 

Supporting power: 90kw tractor

Dimensions: 2060\*1280\*900 (mm)

Line spacing: 400-650 (mm)

Seed tank volume: 21 (L) Fertilizer tank

volume: 82 (L)

Sowing depth: 40-60 (mm)

Fertilization depth: 60-80 (mm)

Efficiency: 4-8 (mu/hour)

Reference price: 70,000 yuan

四行免耕播种机(需配动力、带施肥) Four row no till planter (need power and fertilizer)

#### 免耕的意义 The advantage of no-tillage

#### 免耕播种的优势:

- 1、免耕直播省去了耕地作业,节省了耕地费,播种期提前;若遇阴雨天,免耕更能体 现争时的增产效应。
- 2、免耕地块蓄水保墒能力强;由于地表有秸秆覆盖,土壤的水、肥、气、热可协调供 给,干旱时土壤不易裂缝,雨后不易积水。与翻耕的比玉米生长快,苗情好。另外,肥 料不易流失,产量也相应提高。
- 3、原有土体结构未受到破坏,玉米根系与土壤固结能力强,所以玉米抗倒伏能力强。
- 4、免耕秸秆还田可以增加土壤有机质含量。

- No-tillage seeding has many advantages:
- 1. No-tillage live broadcast saves farmland operations, saves farmland fees and advances the planting period. In case of rainy days, notillage can better reflect the effect of increasing production during competition.
- 2. The no-tillage plot has strong water storage and moisture retention capacity. Due to the straw covering on the ground, the water, fertilizer, gas and heat of the soil can be supplied in a coordinated manner. The soil is not easy to crack during drought and water is not easy to accumulate after rain. Compared with maize in the land after plowing, maize grows faster and the seedlings are better. In addition, the fertilizer is not easy to lose and the output is increased accordingly.
- 3. No-tillage keeps the original soil structure undamaged. The maize root system has a strong ability to consolidate with the soil and the maize has a strong lodging resistance.
- No-tillage straw returning can also increase the soil organic matter content.



免耕作业效果图 No-till operation effect picture

#### 田间管理-灌溉方式 Irrigation





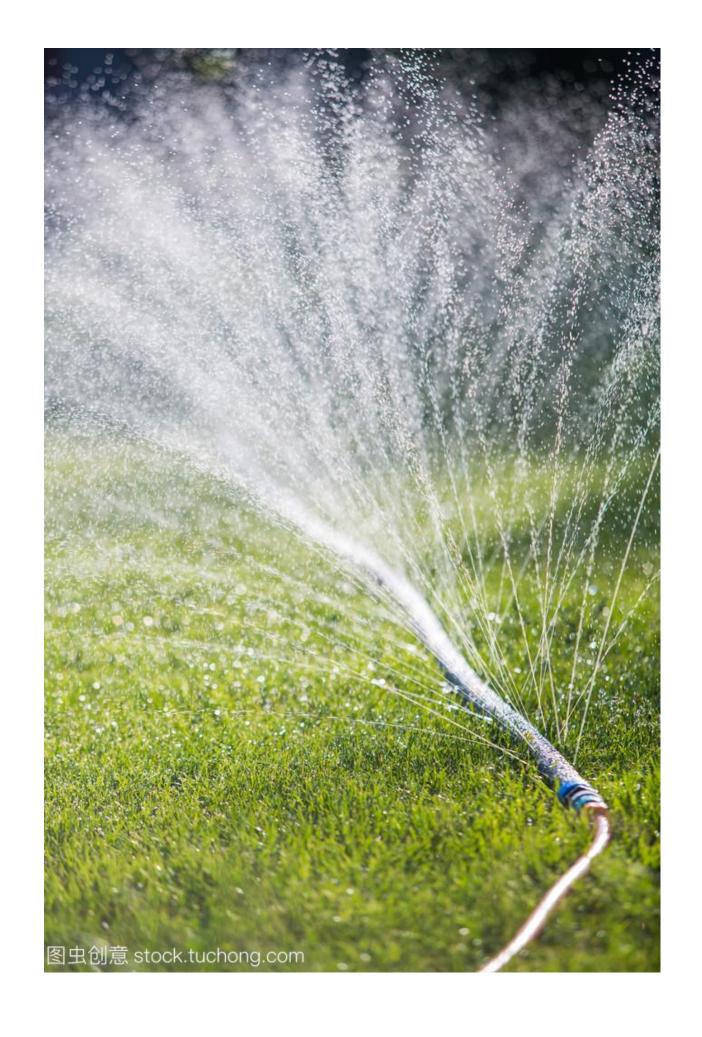


大水漫灌 Flood irrigation

微喷灌(膜下喷灌) Micro sprinkler irrigation (under film)

移动式精准灌溉 Mobile precision irrigation

#### 小型灌溉设备 Small irrigation equipment



汽油水泵

技术参数

动力: 单缸汽油机(5kw)

外形尺寸: 500\*350\*450 (mm)

口径: 50 (mm)

流量: 30 (m³/h)

扬程: 20 (m)

吸程: 8 (m)

重量: 20 (kg)

参考价格: 500元

Gasoline water pump

汽油、柴油抽水泵 Gasoline, diesel pump

Technical Parameters

Power: single-cylinder gasoline engine (5kw)

Dimensions: 500\*350\*450 (mm)

Caliber: 50 (mm)

Flow rate: 30 (m3/h)

Head: 20 (m)

Suction range: 8 (m)

Weight: 20 (kg)

Reference price: 500 yuan

#### 中型灌溉设备 Medium-sized irrigation equipment



卷盘式喷灌设备

Reel sprinkler irrigation equipment

卷盘式喷灌机

技术参数

动力:汽油机(13kw)

外形尺寸: 5190\*2010\*2620 (mm)

口径: 14-24 (mm)

流量: 13-38 (m³/h)

扬程: 47-74 (m)

喷洒幅宽: 47-74 (m)

重量: 1500 (kg)

参考价格: 3.5万元

Reel sprinkler

**Technical Parameters** 

Power: gasoline engine (13kw)

Dimensions: 5190\*2010\*2620

(mm)

Caliber: 14-24 (mm)

Flow rate: 13-38 (m3/h)

Head: 47-74 (m)

Weight: 1500 (kg)

Reference price: 35,000 yuan



东风井关JKB18-H350撒肥机 Dongfeng Jingguan JKB18-H350 fertilizer spreader







背负式喷雾喷粉机

Knapsack spray duster

#### 小型植保设备 Small plant protection equipment





背负式打药机

技术参数

动力: 汽油、电池

外形尺寸: 420\*500\*730 (mm)

射程: >12 (m)

容积: 26 (L)

净重: 12 (kg)

效率:2(亩/小时)

参考价格: 800元

Knapsack sprayer

**Technical Parameters** 

Power: gasoline, battery

Dimensions: 420\*500\*730 (mm)

Range: >12 (m)

Volume: 26 (L) Net weight: 12

(kg)

Efficiency: 2 (mu/hour)

Reference price: 800 yuan

背负式、小型背负式 Backpack, small backpack

### Model recommendation

#### 中型植保设备 Medium plant protection equipment



自走高轮式打药机

技术参数

动力:柴油、汽油

外形尺寸: 4600\*1680\*2270 (mm)

容积: 700(L)

离地间隔: 1.4(米)

喷雾角度:110(度)

喷头数量: 23

效率: 60(亩/小时) 参考价格: 3万元 Self-propelled high-wheel sprayer

**Technical Parameters** 

Power: diesel, gasoline

Dimensions: 4600\*1680\*2270 (mm)

Volume: 700 (L)

Ground clearance: 1.4 (m)

Spray angle: 110 (degrees) Number of

nozzles: 23

Efficiency: 60 (mu/hour)

Reference price: 30,000 yuan



悬挂式打药机

技术参数

动力: 50 (kw) 拖拉机

外形尺寸:

3800\*3200\*2000 (mm)

容积: 1000 (L)

离地间隔: 0.5(米)

喷雾角度: 110(度)

喷头数量: 23-32

效率: 100(亩/小时)

参考价格: 5000元

自走高地隙、悬挂式(需动力)

Self propelled high clearance, Traction backpack (power required)

Hanging sprayer

**Technical Parameters** 

Power: 50 (kw) tractor

Dimensions: 3800\*3200\*2000 (mm)

Volume: 1000 (L)

Ground clearance: 0.5 (m)

Spray angle: 110 (degrees) Number

of nozzles: 23-32

Efficiency: 100 (mu/hour)

Reference price: 5000 yuan



农用无人机 Agricultural drone

## 推荐机型 Model recommendation



整机重量轻、待电时间长; 机臂可折叠。技术参数:作业速度快(≥7m/s),药箱容积16L,喷雾量: 1600-2000ml/min;

The whole machine is light in weight and long standby time; the arm can be folded. Technical parameters: fast working speed (≥7m/s), medicine box volume 16L, spray volume: 1600-2000ml/min;





摘穗作业穗收作业穗收青饲玉米收获PickingEar harvestEar harvestGreen forage corn harvest

Maize Harvesting

#### 小型收获设备 Small harvesting equipment



机器重量:120KG 工作速度:2000-3000(M/H)

工作效率: 2-5亩/时 留茬高度: <8cm

工作幅宽: 200mm 秸秆粉碎率: >98%,<4.5cm

收割行数: 1行/单垄 配套动力: 汽油机、柴油机

车轮间距: 700mm 外形尺寸: 1200x500x1500mm



手扶自走收获机 hand-held self-propelled harvester

Hand-held self-propelled harvester

**Technical Parameters** 

Power: Diesel

Dimensions: 1200\*500\*1500 (mm)

Working width: 420 (mm)

Job line spacing requirements: >100 (mm)

Weight: 228 (kg)

Efficiency: 1-2 (mu/hour)

Reference price: 5000 yuan

#### 中型收获设备 Medium harvesting equipment





多行自走收获机 Multi-row self-propelled harvester 自走式玉米收获机

技术参数

动力: 柴油

外形尺寸: 6400\*3000\*2450 (mm)

作业幅宽: 420 (mm)

重量: 800 (kg)

效率: 3-5 (亩/小时)

参考价格:5万元

Self-propelled corn harvester

Technical parameters

Power: Diesel

Dimensions: 6400\*3000\*2450 (mm)

Working width: 420 (mm)

Weight: 800 (kg)

Efficiency: 3-5 (mu/hour)

Reference price: 50,000 yuan

#### 中型收获设备 Medium harvesting equipment



悬挂式收获机(需配套动力) knapsack harvester (supporting power required)

悬挂式收获机

技术参数

动力: 18 (kw) 以上拖拉机

适用行距: 350-800 (mm)

作业行数: 2

效率: 2.5-4(亩/小时)

参考价格: 1.5万元

Knapsack harvester

Technical parameters

Power: tractor above 18 (kw)

Applicable line spacing: 350-800 (mm)

Rows: 2

Efficiency: 2.5-4 (mu/hour) Reference

price: 15,000 yuan





摘穗 Picking 脱皮 Peeling

晒穗 Sun-dried 脱粒 Threshing



## 小型脱粒设备 Small threshing equipment





柜式玉米脱粒机

技术参数

功率: 2.2 (kw)

尺寸: 1250\*600\*1250 (mm)

工作形式:人工上料、全自动脱粒

重量: 100 (kg)

效率: 500 (kg/h)

参考价格: 1.8万元

Cabinet type threshing

Technical parameters

Power: 2.2 (kw)

Size: 1250\*600\*1250 (mm)

Work form: manual feeding, fully

automatic threshing

Weight: 100 (kg)

Efficiency: 500 (kg/h)

Reference price: 18,000 yuan

小型柜式脱粒设备 Small cabinet type threshing equipment

## 推荐机型

#### Model recommendation

中型脱粒设备 Midium threshing equipment



悬挂式玉米脱粒机

技术参数

动力: 22 (kw) 以上拖拉机

尺寸: 5200\*1600\*2500 (mm)

工作形式:自动上料、全自动脱粒

重量: >590 (kg)

效率: >8 (t/h)

参考价格: 5-10万元

Suspended corn thresher

Technical parameters

Power: tractor above 22 (kw)

Size: 5200\*1600\*2500 (mm)

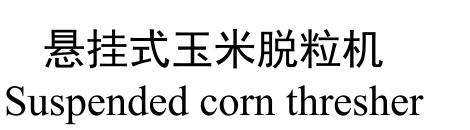
Work form: automatic feeding,

automatic threshing

Weight: >590 (kg)

Efficiency: >8 (t/h)

Reference price: 50,000-100,000 yuan







## 小型烘干设备 Small drying equipment



Barrel drying equipment Technical parameters (refer to the right table)

Reference price: 10,000-50,000 yuan

桶式烘干机

技术参数(参考右表)

参考价格: 1-5万元

桶式烘干设备 Barrel drying equipment



Power 功率	Output 产量	Weight 重量	Dimensions 外形尺寸
(kw)	(kg/h)	(kg)	(mm)
3	10	15	700*500*600
4	50	75	1100*600*700
6	100	150	1600*700*800
8	200	300	2000*900*1100
10	300	450	2500*1100*1300
12	500	750	3200*1200*1400
18	1000	1500	3800*1500*1500
25	2000	3000	4300*1600*1800



#### 中型烘干设备 Medium Drying equipment





塔式烘干机 Tower dryer equipment

塔式烘干机

技术参数

功率: 22(kw) 电热或煤热

进风温度: 45-105 (摄氏度)

装机容量: >40 ( m³ )

效率: >8 (吨/小时)

参考价格: 8-15万元

Tower dryer equipment

Technical Parameters

Power: 22 (kw) electric heating

or coal heating

Inlet air temperature: 45-105

(degrees Celsius)

Installed capacity:  $>40 \text{ (m}^3)$ 

Efficiency: >8 (tons/hour)

Reference price: 80-150 thousand yuan





## 规模化种植玉米全程机械化解决方案

Solution of Whole Process Mechanization for large-scale Maize planting



#### 耕地

Tillage



Sowing



#### 施药

Pesticide application

收获

Harvesting







### 中等规模种植玉米全程机械化解决方案

Solution of Whole Process Mechanization for Medium-scale Maize planting





Tillage





Sowing





Pesticide application



Harvesting

生产环节 Process	机械名称 Equipment	价格(元) Price (CNY)
动力机械 Power machinery	50马力以上带液压输出拖拉机 Tractor with hydraulic output above 50 horsepower	70000
翻地 Plowing	牵引式翻地犁 Traction plough	10000
播种 Sowing	两行播种机 Two-row planter	5000
植保、追肥 Plant protection, top dressing	悬挂式打药机 spraye	5000
收获机 Harvester	2行悬挂式收获机 2-row knapsack harvester	15000
烘干设备 Drying equipment	烘干机 Dryer	20000
总计 Total		13.5W

## 小规模种植玉米全程机械化解决方案

Solution of Whole Process Mechanization for Small-scale Maize planting



生产环节 Process	机械名称 Equipment	价格(元) Price (CNY)	
动力机械 Power machinery		0	
翻地 Plowing	手扶式翻地机 walking type Plough	8000	
播种、施肥 Sowing, fertilization,	手持 Handheld	2000	
植保、追肥 Plant protection, top dressing	电动背负式 Electric knapsack	500	
收获机 Harvester	手持收获设备 Handheld harvesting equipment	1000	
烘干设备 Drying equipment		0	
总计		11500	





## 规模化种植玉米全程机械化经济效益分析

Analysis of Economic Benefits of the Whole Mechanization of Large-scale Maize Planting



#### 特点 Characteristics

规模化种植面积大,春播、打药,收获时间紧任务重,十分适合全程机械化作业。

The large-scale planting area is large, spring sowing, spraying medicine, and the harvest time is tight and the task is heavy. It is very suitable for the whole mechanized operation.



#### 节本增效 Save cost and increase efficiency

机械化种植大幅节省人力,节本增效效果最明显。

Mechanized planting greatly saves manpower and has the most obvious effect of saving costs and increasing efficiency.



#### 难点 Difficulty

产量高,同时需处理的产物过多,生产工作时间集中。 High Yield,

Many crops to be processed at the same time.



#### 全程方案 Whole process plan

大型机械耕地-播种-植保、田间管理-收获-脱粒-烘干-耕地。

Tillage with large machinery-Sowing-Plant protection, field management-Harvest-Threshing-Drying-Tillage

## 中等规模玉米全程机械化经济效益分析

Analysis on Economic Benefits of Whole Mechanization of Medium-scale Maize Planting



#### 特点 Characteristics

中等规模种植农户,长期机械化种植可节本,节省人工,短期投入比较大。 In medium-scale corn planting model, long-term mechanized planting can save costs, save labor, while short-term investment is relatively large.



#### 难点 Difficulty

籽粒收获机等大型设备使用成本过高。

The cost of using large-scale equipment such as grain harvesters is too high.



#### 节本增效 Save cost and increase efficiency

具体节本增效成果需要根据农户投入、种植面积等因素具体计算。处于半机械化状态。 Rice planting is in a semi-mechanized state. The specific cost-saving and efficiency-increasing results need to be calculated based on factors such as farmers' input and planting area.



#### 全程方案 Whole process plan

小型机械耕地-播种-植保、田间管理-收获-脱粒-烘干-耕地 Tillage with small machinerysowing-plant protection, field management-harvesting-threshingdrying-Tillage.



### 零散种植玉米全程机械化经济效益分析

Analysis of Economic Benefits of Whole Mechanization of Scattered Maize Planting



#### 特点 Characteristics

零散种植面积小,不适合大型机具作业。

The scattered planting area is small and not suitable for large-scale machine operations.



#### 难点 Difficulty

籽粒收获机等大型设备使用成本过高。

The cost of using large-scale equipment such as grain harvesters is too high.



#### 节本增效 Save cost and increase efficiency

种植面积有限,限制农户资金投入能力,无法实现机械化种植。可以使用现在现有的农机具或者农机租赁服务

The limited planting area limits the ability of farmers to invest in funds and cannot achieve mechanized planting. Existing farm machinery or farm machinery rental service can be used



#### 全程方案 Whole process plan

小型设备翻地-人工播种-人工植保、田间管理-人工收获。

Plowing with small equipmentartificial seeding-artificial plant protection, field managementartificial harvest.



## 经济效益分析 Economic Benefit Analysis

#### 机械化生产营利面积计算

#### Calculation of profitable area of mechanized production

	大规模种植	中等规模种植	小规模种植
	Large-scale	Medium-scale	Small-scale
	planting	planting	planting
固定成本(元) Fixed cost (CNY)	630000	135000	11500
年均折旧成本(元) Average annual depreciation cost (CNY)	126000	27000	2300
化肥农药成本(元/亩)Manpower, fertilizer and pesticide cost (CNY/mu)	550	550	550
运营成本(人工、燃油等)(元/亩)	250	250	250
营利面积(亩) Profitable area (mu)	1260	270	23

2018年斯里兰卡亩产为250kg/亩。玉米单价1.66-1.88元/斤,单亩毛利为830-940元。单亩利润在330元左右。
The corn yield per mu in 2018 was 250kg/mu. The unit price of corn is 1.66-1.88 yuan/jin, and the gross profit per mu is 830-940 yuan. The profit per mu is around 330 yuan.

当单季种植规模大于营利面积线时,可保证在回收成本时有利润。

When the planting scale of a single season is larger than the profit area line, the profit can be guaranteed when the cost is recovered.





## 玉米全程机械化发展趋势

#### the Development Trend of Maize Mechanization



时代是属于信息化的时代,跟不上时代潮流的必定被时代所抛弃。农业也面临着从传统农耕到信息化的转变。但受 限于我国农机机械化水平落后于发达国家,农业信息也会面临诸多限制,但随着5G网络普及,电脑的普遍使用,农 机农艺需要迎着时代,创造出让农民更加便利的农业装备。

Agriculture is facing the transition from traditional farming to informatization. With the popularization of 5G networks and the widespread use of computers, agricultural machinery and agronomy will create agricultural equipment providign more convenience to farmers.



## 玉米全程机械化技术展望

Prospects of Maize Mechanization Technology



无人驾驶拖拉机, 省去人工操作,将 人工从繁重、环境 条件差的情况中解 放出来。

Unmanned tractor frees the labor from the heavy work.





以农机为基础单元组成联网, 测量作业区域以及作业数量, 从而形成我国农业种植的大数 据平台。

Use agricultural machinery as the basic unit forming a network, forming a big data platform for agricultural planting in China.



智慧农业打造全新的种植方式, 让农艺更加适合农机本身特性, 提高种植效率。

Smart agriculture creates new planting methods, making agronomy more suitable for the characteristics of agricultural machinery and improving planting efficiency.







#### Q1: 免耕播种机的优势有哪些?

#### Q1: What are the advantages of no-tillage planters?

答案: 1、免耕直播省去了耕地作业,节省了作业费,播种期提前,比常规平播提前1~2d。

- 2、免耕地块蓄水保墒能力强。由于地表有秸秆覆盖,土壤的水、肥、气、热可协调供给,干旱时土壤不易裂缝,雨后不易积水。比翻耕地的玉米生长快,苗情好。
- 3、玉米<mark>抗倒伏性好</mark>。免耕玉米表层根量多,主根发达,加之原有土体结构未受到破坏,玉米根系与土壤固结能力强,所以玉米抗倒伏能力强。
- 4、麦秸还田<mark>增加了土壤有机质含量</mark>,提高了土壤肥力,改善了土壤结构。经测算,玉米免耕地块比翻耕地块增收玉米765kg/公顷,同时可减少耕地作业费105元/公顷,间苗 费60元/公顷,玉米生育期间减少1次浇水,节水节油75元/公顷。

#### Answer:

- 1. No-tillage live broadcast saves arable land operations, saves operating costs, and advances the planting date, 1 to 2 days earlier than conventional flat sowing.
- 2. No-tillage plots have strong water storage and moisture retention capacity. Due to the straw covering on the ground, the water, fertilizer, gas, and heat of the soil can be supplied in a coordinated manner. The soil is not prone to cracks during drought, and it is not prone to water accumulation after rain. Compared with plowing, it grows faster than corn and has better seedling conditions.
- 3. Corn planting with no-tillage has good lodging resistance. No-tillage corn has a large number of surface roots and a well-developed main root. In addition, the original soil structure has not been damaged, and the corn root system has a strong ability to consolidate with the soil, so corn has a strong lodging resistance.
- 4. Returning wheat straw to the field increases the soil organic matter content, improves soil fertility, and improves soil structure. According to calculations, corn no-tillage plots increase corn yield by 765kg/ha compared to plowed plots, and can reduce farmland operation costs by 105 yuan/ha, thinning fees by 60 yuan/ha, and reduce watering once during corn growth, saving water and oil by 75 Yuan/ha.



Q2: 玉米收获后烘干有什么优势?

Q2: What are the advantages of drying corn after harvest?

#### 答案:

- 1、传统晾晒受时节、天气影响大。湿玉米不利于谷物存储,又会产生大量的仓储、物流浪费。烘干可解决这类问题。
- 2、在美国、加拿大等世界农业领先国家中,粮食在收后晾晒、储运、加工等环节的损耗率在3%。为减少损耗率,需要提高各环节生产效率,产后谷物烘干应运而生。

#### Answer:

- 1. Traditional drying is greatly affected by seasons and weather. Wet corn is not conducive to grain storage, and will produce a lot of storage and logistics waste. Drying can solve such problems.
- 2. In the world's leading agricultural countries such as the United States and Canada, the loss rate of grain after harvesting, drying, storage, transportation, and processing is 3%. In order to reduce the wastage rate, it is necessary to improve the production efficiency of each link, and post-production grain drying comes into being.



Q3: 使用机械化作业后会让我增产吗?

Q3: Will the use of mechanized operations increase my production?

#### 答案:

机械化作业的目的是代替人工作业,节省人力输出,保证作业品质。把更多的人力节省出来从事其他活动。农户的种植面积在其劳动能力之内时,机械化种植并不能提升农业作业品质。并且影响粮食产量的因素很多,例如雨水、虫灾、土地肥力等,所以机械化种植不一定会让粮食增产。

#### Answer:

The purpose of mechanized operations is to replace manual operations, save manpower output, and ensure the quality of operations. Save more manpower for other activities. When farmers' planting area is within their labor capacity, mechanized planting cannot improve the quality of agricultural operations. And there are many factors that affect grain production, such as rain, insect damage, and land fertility, so mechanized planting may not increase grain production.

