

Experiences in Promoting Integrated Straw Management in China

Dr. He Jin

Deputy Dean/Professor, National Institute for Conservation Tillage, China Agricultural University

Conservation Tillage Research Center, Ministry of Agriculture and Rural Affairs, China

25, Mar. 2026



CSAM

Centre for Sustainable
Agricultural Mechanization

**Thanks for the support of Center for Sustainable
Agricultural Mechanization (ESCAP-CSAM) and
our Cambodian friends!**



□ Development of integrated straw utilization in China

□ Experiences in promoting integrated straw
management in China



1. Development of integrated straw utilization in China

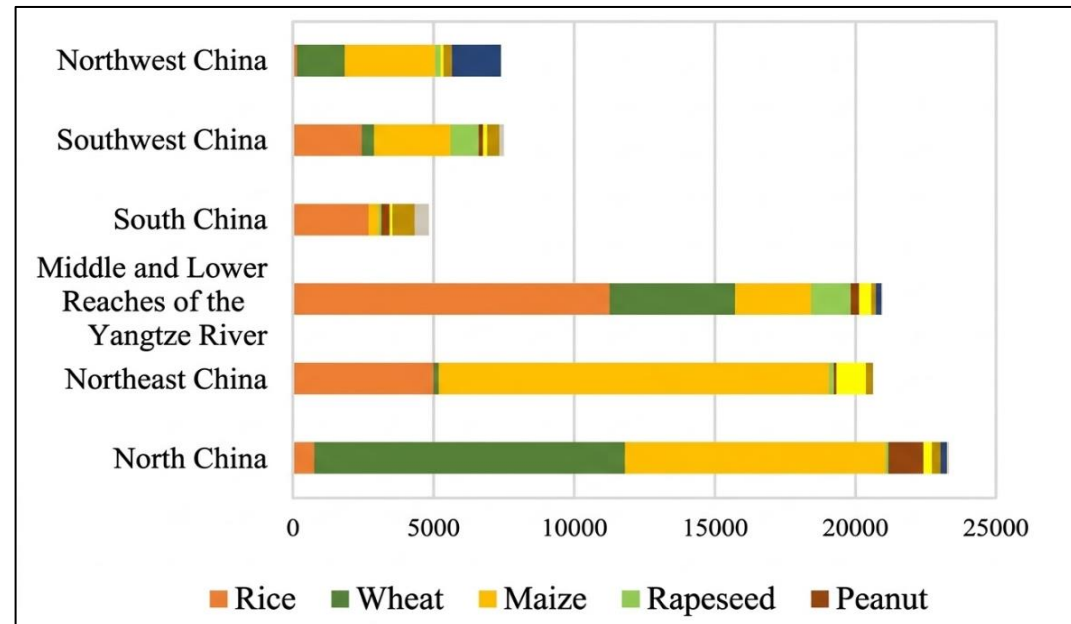
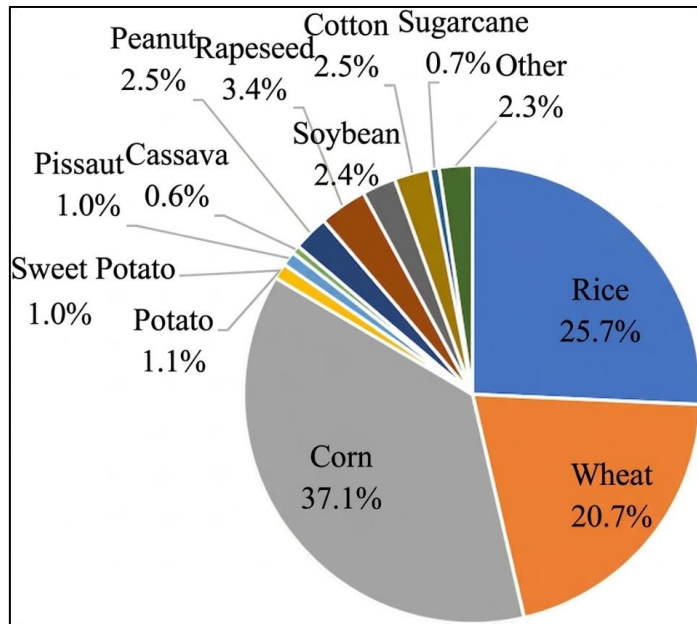
1.1 Overview of national straw resources

- **National Straw Production: 870 million tons (2024);**

- **Proportion of crop straw production:**

By crop type: Maize, rice and wheat accounted for more than **74%** of the national total.

By region: Northeast China, the Huang-Huai-Hai Region and the Middle and Lower Yangtze River Region contributed over **73%** of the national total.



Great challenge for properly using of such a large straw output!

1.2 The attention of society to ban straw open burning

- ◆ Straw burning was a **long-term problem** in China;
- ◆ Chinese government has adopted **many straw burning prohibition and management measures** for more than 25 years.

Management measures for the prohibition of straw burning and integrated straw management (1999)

(1999年4月16日, 国家环境保护总局、农业部、财政部、铁道部、交通部和中国民航总局发布, 环发〔1999〕98号)



1.3 Policies related to integrated straw management

1. The prohibition of straw burning

秸秆禁烧和综合利用管理办法

(1999年4月16日, 国家环境保护总局、农业部、财政部、铁道部、交通部和民航总局发布, 环发[1999] 98号)

中华人民共和国大气污染防治法

(2000年4月29日第九届全国人民代表大会常务委员会第十五次会议通过, 2000年4月29日中华人民共和国主席令第32号公布, 自2000年9月1日起施行)

中华人民共和国中央人民政府
www.gov.cn

索引号: 000014349/2023-00076 主题分类: 城乡建设、环境保护\环境监测、保护与治理
发文机关: 国务院 成文日期: 2023年11月30日
标 题: 国务院关于印发《空气质量持续改善行动计划》的通知
发文字号: 国发〔2023〕24号 发布日期: 2023年12月07日

国务院关于印发
《空气质量持续改善行动计划》的通知
国发〔2023〕24号

2. Policies for integrated straw management

国家发展和改革委员会行政规范性文件

国家发展改革委、农业部、财政部关于印发“十二五”农作物秸秆综合利用实施方案的通知
(发改环资〔2011〕2615号 2011年11月29日印发)

各省、自治区、直辖市发展改革委、经
济社会发展改革委、农业厅、财政厅：
为落实《国务院办公厅关于加快推
进农作物秸秆综合利用的意见》，加
快推进农作物秸秆（以下简称“
秸秆”）综合利用，国家发展改革委、农
业部、财政部联合制定《“十二
五”农作物秸秆综合利用实施方案》，
现予印发，请遵照执行。

中华人民共和国中央人民政府
www.gov.cn

发展改革委 农业部关于印发编制秸秆综合利用规划的指导意见的通知
发改环资〔2009〕378号

各省、自治区、直辖市及计划单列市、副省级省会城市、新疆生产建设兵团发展改革委、经贸委（经委）、农业厅（委、办、局）、广西壮族自
治区林业厅、湖南省农村工作办公室：
为贯彻落实《国务院办公厅关于加快推进
农作物秸秆综合利用的意见》，现印
发《编制秸秆综合利用规划的指导意见》，
请遵照执行。

中华人民共和国农业农村部
Ministry of Agriculture and Rural Affairs of the People's Republic of China

政府信息公开

索引号: 078090414201900212 信息所属单位: 科技教育司
信息名称: 农业农村部办公厅关于全面做好秸秆综合利用工作的通知
文 号: 农办科〔2019〕20号 生效日期: 发布日期: 2019年04月19日
内容概述: 开展秸秆综合利用工作, 是提升耕地质量、改善农业农村环境、实现农业高质量发展、绿色发展的重要举措。2016年以来, 部
分省(区)开展了秸秆综合利用试点工作, 取得了一定成效。经研究, 决定开始全面推动秸秆综合利用工作, 现就有关事项通
知如下。

农业农村部办公厅关于全面做好秸秆综合利用工作的通知

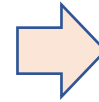
The core principle is to **promote integrated straw management of straw**, combined with the **prohibition of straw burning**.

3. Regional policies

- ✓ Many provinces issued **action plans** or **implementation guidelines** for straw utilization;
 - ✓ Setting utilization rate targets, supporting enterprises, improving straw-collection and storage systems, promoting demonstration sites, etc.
- **Henan:** By 2027, cultivate leading straw utilization enterprises and maintain the provincial straw utilization rate above 93%.
 - **Inner Mongolia:** By 2025, establish 20 key counties (banners) for straw utilization, prioritizing feed utilization and promoting new technologies.
 - **Shanxi:** Further improve straw collection, storage, and transportation system.
 - Integrated straw management throughout the **Beijing–Tianjin-Hebei** and surrounding areas.
 - Ministry of Agriculture issued the Implementation Plan for the **Northeast Region** Straw Management Action in 2017.
 - **Gansu, Shandong, Heilongjiang, Hebei, etc.**

4. National objective for utilization rate of integrated straw management

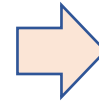
◆“Management measures for the prohibition of straw burning and integrated straw management”: target for utilization rate is over 60% by 2002.



秸秆禁烧和综合利用管理办法

(1999年4月16日, 国家环境保护总局、农业部、财政部、铁道部、交通部和中国民航总局发布, 环发〔1999〕98号)

◆The General Office of the State Council issued the “Opinions on accelerating the integrated straw management”: target is 80% by 2015.



中华人民共和国中央人民政府
www.gov.cn

首页 > 国务院公报 > 2009年第21号

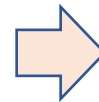
发展改革委 农业部关于印发编制秸秆综合利用规划的指导意见的通知
发改环资〔2009〕378号

各省、自治区、直辖市及计划单列市、副省级省会城市、新疆生产建设兵团发展改革委、经贸委(经委)、农业厅(委、办、局)、广西壮族自治区林业厅、湖南省农村工作办公室:

为贯彻落实《国务院办公厅关于加快推进农作物秸秆综合利用的意见》(国办发〔2008〕105号)文件精神, 我们研究起草了《关于编制秸秆综合利用规划的指导意见》, 现印发你们, 请结合各地情况, 组织做好秸秆综合利用规划的编制工作, 并按进度要求上报规划成果。

发展改革委
农业部
二〇〇九年二月九日

◆“Notice on further accelerating the integrated straw management and the ban on burning”: target is over 85% by 2020.



中华人民共和国国家发展和改革委员会
National Development and Reform Commission

首页 机构设置 新闻动态 政务公开 政务服务

首页 > 政务公开 > 政策 > 通知

关于进一步加快推进农作物秸秆综合利用和禁烧工作的通知(发改环资〔2015〕2651号)

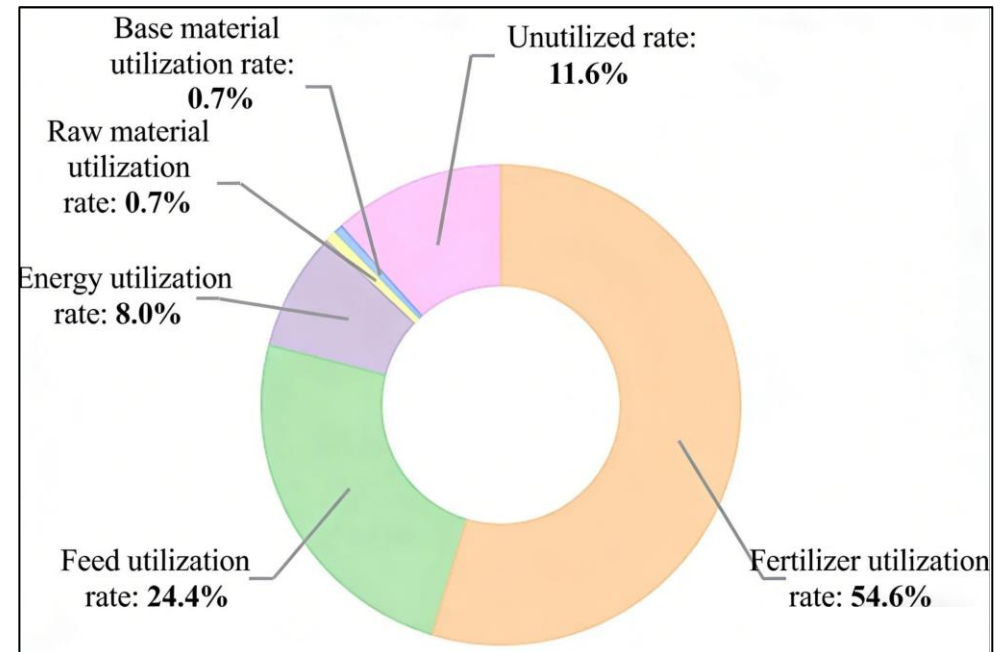
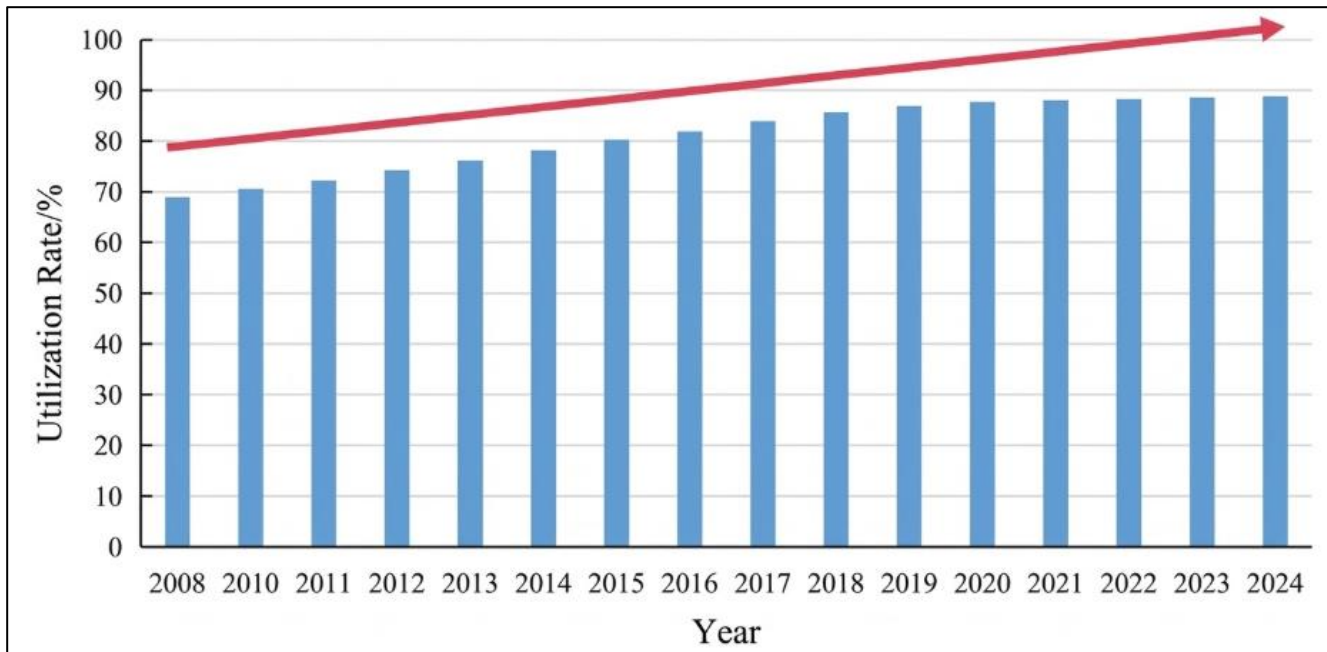
5. Encouragement and promotion of relevant technologies and equipment

- ◆ Agricultural machinery purchase subsidy policies were introduced and fully implemented.
- ◆ Agricultural technology demonstration sites were constructed.
- ◆ Technical training and guidance were strengthened.



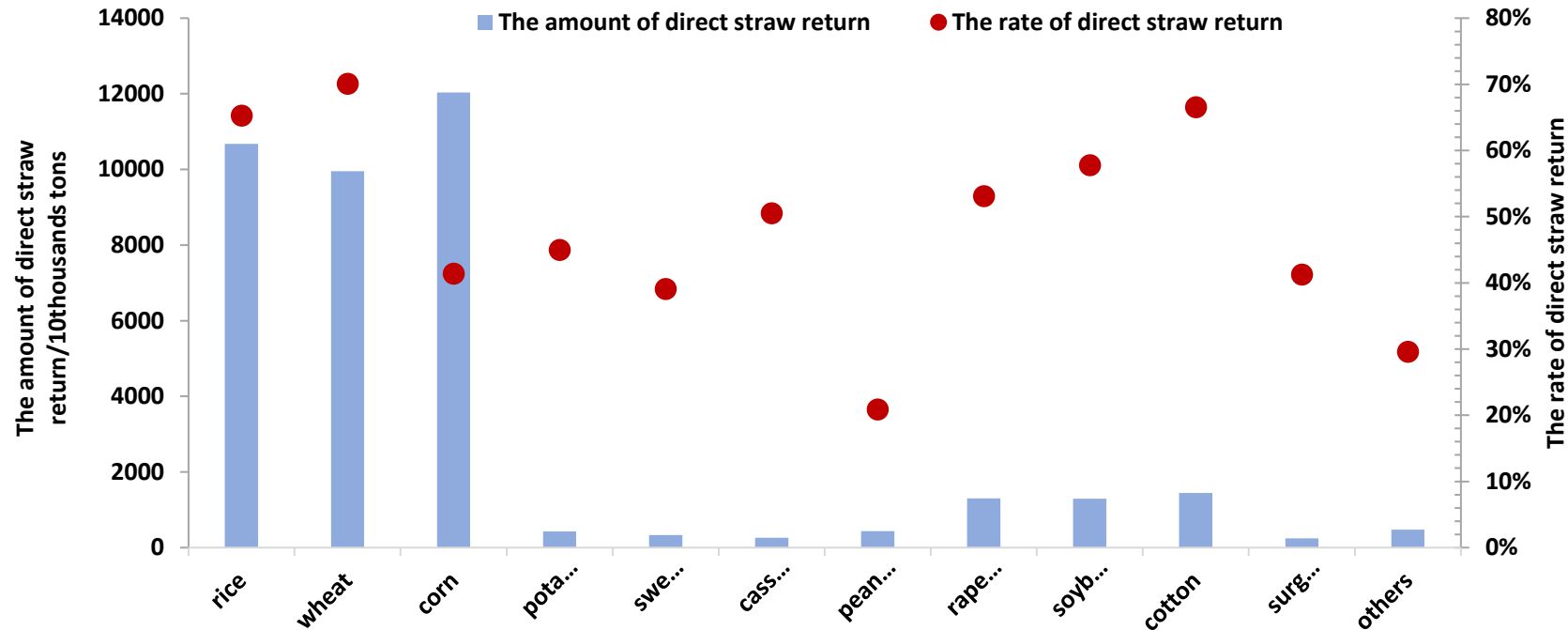
1.4 National comprehensive utilization rate of straw

- ◆ In 2024, national comprehensive utilization rate of straw exceeded **88%**.
- ◆ Straw used as **fertilizer** accounts for **more than half** of the total crop straw output, followed by straw used as **feed and energy**.



Returning straw to fields is the most common method for straw use

(Improves soil fertility, enhances soil structure, increases grain production, etc.)



- In 2022, **nationwide direct straw return** reached **382 million** tons, accounting for **52.3%** of the collectible straw. Among them, the **amounts of maize, rice, and wheat straw** were 126, 120 and 100 million tons, accounting for **42.6%, 66.5% and 73.7%** of the collectible amounts, respectively.

2. Experiences in promoting integrated straw management in China

2.1 Policy support

- ✓ **The No.1 Central Document** has emphasized **straw returning, comprehensive utilization, and burning control** from 2017 to 2026
- ✓ **Financial supports, Demonstration sites, Technology and equipment development, etc.**

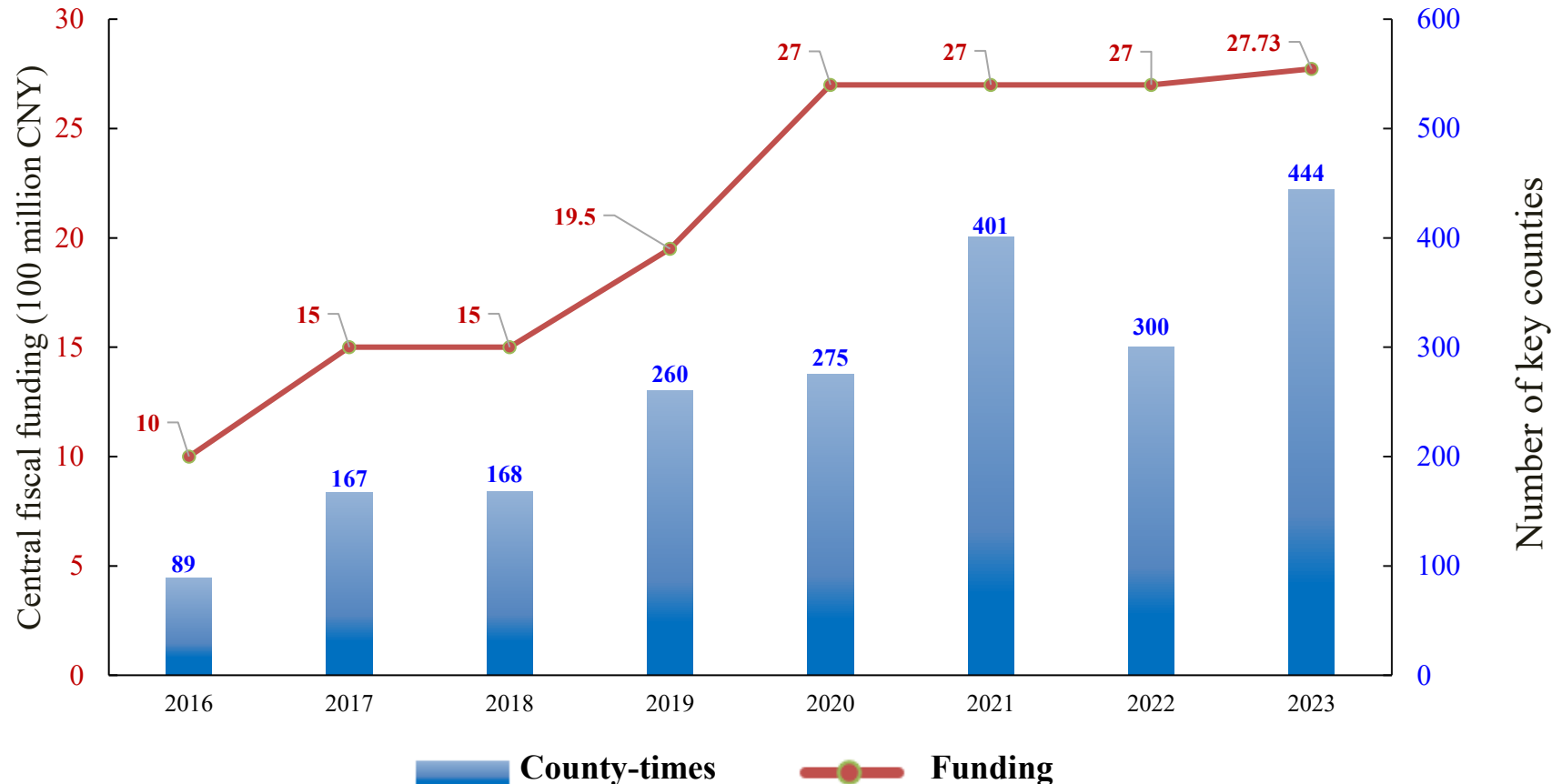
| | |
|------|--|
| 2026 | Enhance the capacity for integrated straw utilization |
| 2025 | Support integrated straw utilization , precisely define no-burn zones, and enforce open burning control in accordance with laws and regulations |
| 2024 | Promote the coordinated resource utilization of agricultural organic wastes |
| 2023 | Establish and improve systems for the collection, utilization, and treatment of agricultural wastes , including straw , agricultural film, pesticide packaging waste, and livestock manure |
| 2022 | Support integrated straw utilization |
| 2021 | Fully implement integrated straw utilization |
| 2020 | Advance integrated straw utilization |
| 2019 | Promote the resource utilization of agricultural wastes such as livestock manure, straw , and agricultural film |
| 2018 | Promote integrated utilization of crop straw |
| 2017 | Encourage local governments to strengthen support for crop straw utilization and improve subsidy mechanisms for diversified straw utilization |



2.2 Financial investment

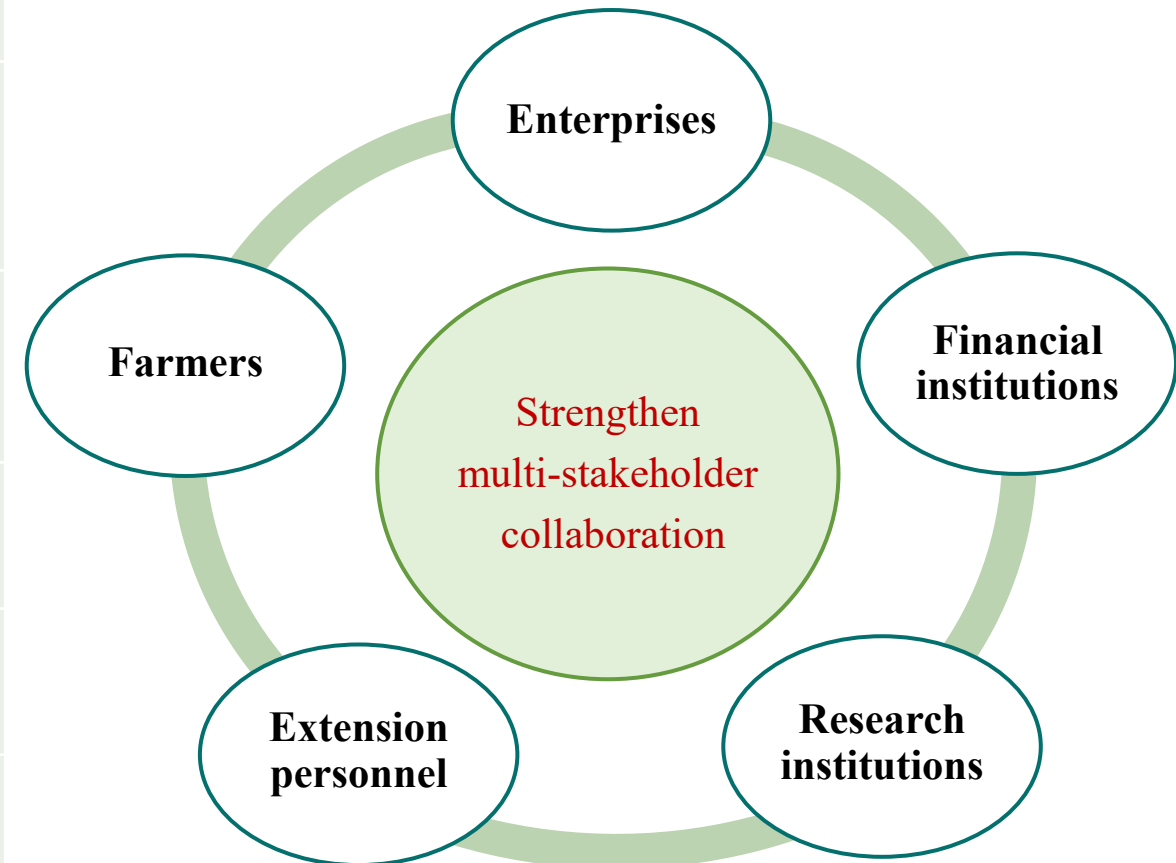
- ✓ Since 2016, the central government has invested about **20 billion yuan** and **established over 400 key counties** for straw utilization.

Increasing central funding (100 million CNY)



✓ Through **fiscal support** and **subsidies**, multiple stakeholders (**enterprises, farmers, financial institutions, research institutions**, etc.) are **mobilized** to collaborate in straw utilization.

| Target group | Support measures |
|-------------------------------|--|
| Financial institutions | Providing financing support, loan guarantees , etc. |
| Research institutions | Scientific projects, Support technology development and innovation for straw utilization |
| Enterprises | Fiscal subsidies for equipment-production , Preferential land and electricity policies, etc. |
| Extension institutions | Project funding and service subsidies for technology promotion |
| Farmers | Subsidies for using of integrated straw management technologies , Preferential electricity pricing for straw collection, etc. |

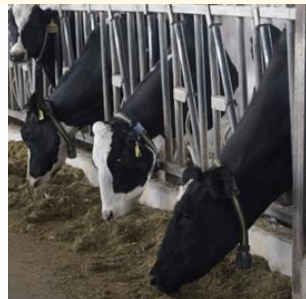
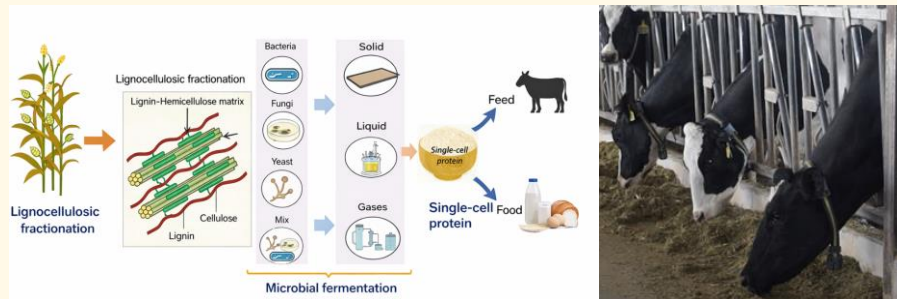


2.3 Key technologies and equipment

- ✓ **Accelerate technological innovation** in straw utilization for fertilizer, feed, energy, and high-value applications
- ✓ Promote the development of supporting **equipment** systems.

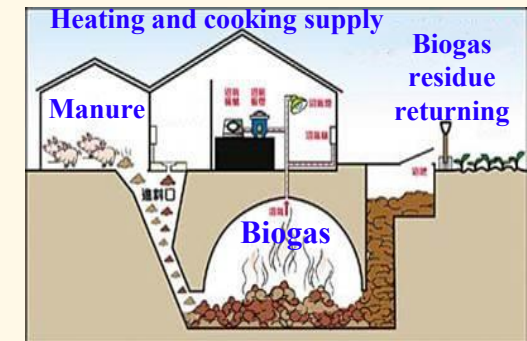
Used for feed

- Corn silage technology
- Crushing and shredding technology
- Straw-based functional protein feed production technology, etc.



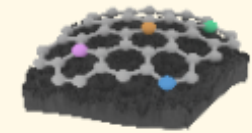
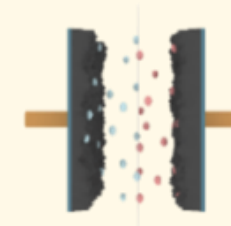
Used for energy

- Direct combustion technology
- Anaerobic digestion technology, etc.



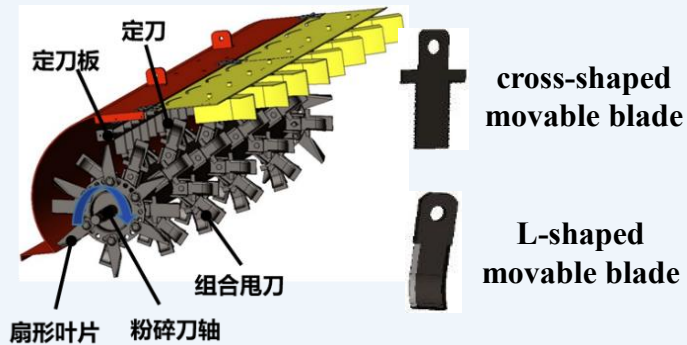
High-value utilization

- Production of adsorbents, energy storage materials, catalysts, etc.

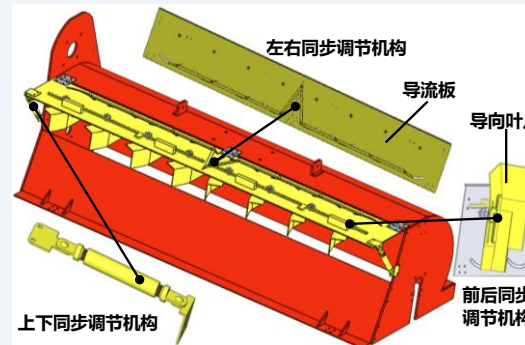


Example 1: Straw returning (used as fertilizer)

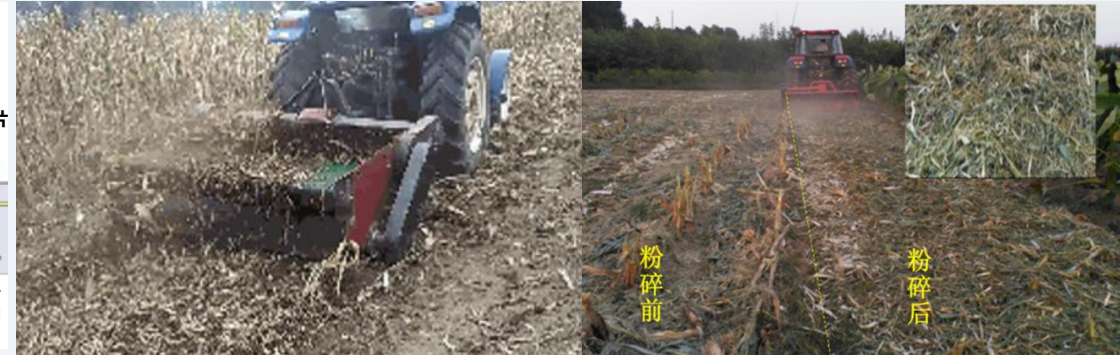
Straw/stubble management machines: High-efficiency, low-energy chopping and spreading



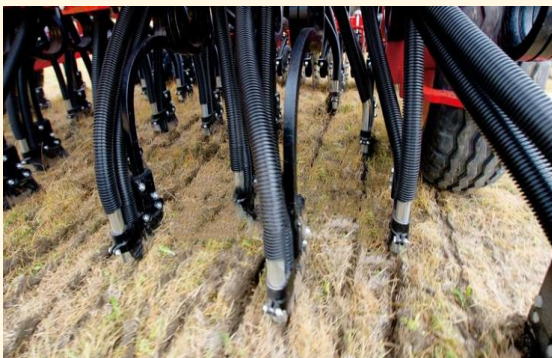
Optimize blade geometry



Improved uniformity of straw spreading



No/minimum-till seeder: Residue handling technology



Residue slips from Tine Opener



Residue cut by Disc Opener



Residues handled by powered components

Example 1: **Straw returning** (used as fertilizer)

- ✓ **Promote straw return according to local conditions** by optimizing return rates, incorporation methods, and supporting agronomic practices for different regions and cropping systems.

Northeast China: Low temperatures, Slow decomposition of straw

- ✓ **Straw mixed with the soils:** Plow the straw into the soils immediately after harvest, and **straw-decomposition agents** and **additional urea** are applied to accelerate decomposition.



- ✓ **Straw cover:** Use a straw clearing machine to **create clean seedbeds before no-till seeding.**



Huang-Huai-Hai Plain:
(large amount of crops straw)

- ✓ **Straw chopping and uniform spreading**, followed by 1–2 times **rotary tillage** for stubble incorporation, and **subsoiling** every 2–3 years; then **Planting**;
- ✓ **No-tillage planting.**

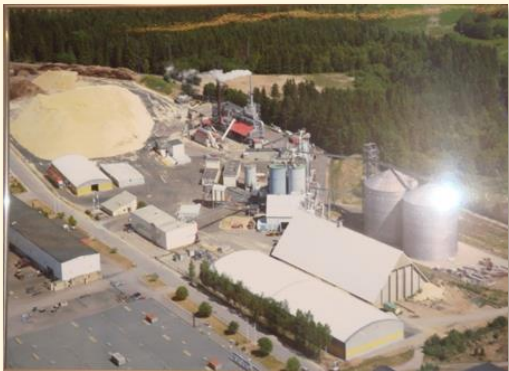


Example 2: Straw used as energy

Small-scale rural areas: Small equipment (straw briquette stoves, straw bale-fired boilers, etc.)



Plant for industrial heat and power supply: Large equipment



2.4 Strengthen monitoring, demonstration and training

(1) Establish pilot sites for scientific research

◆ In 2022, total 42 **monitoring stations for straw incorporation** were established across major grain-producing regions nationwide.

◆ **Monitor and evaluate:** straw incorporation's effects on crop yields, soil quality, and pest and weed control.



Straw returning to fields monitoring station (Beijing Shunyi)



Straw returning to fields monitoring station (Harbin, Heilongjiang)

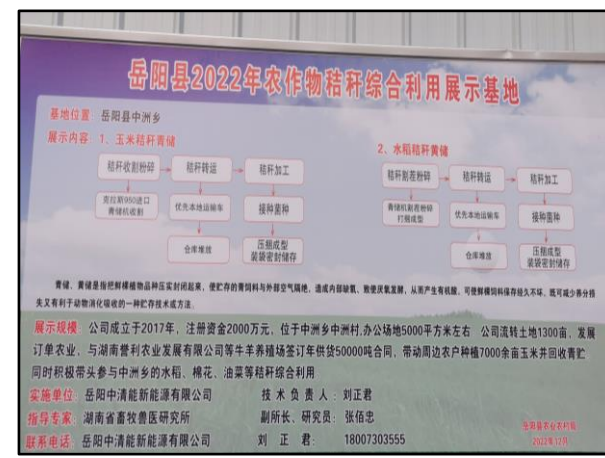


Monitoring of ecological effects of straw returning to fields

(2) Demonstration areas for integrated straw management

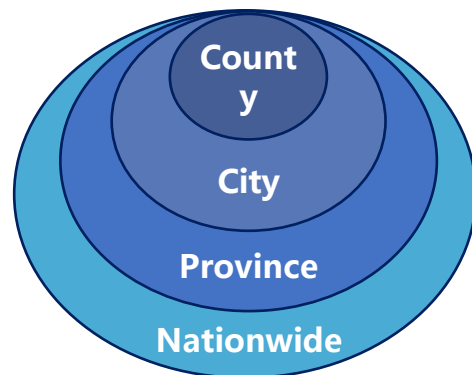
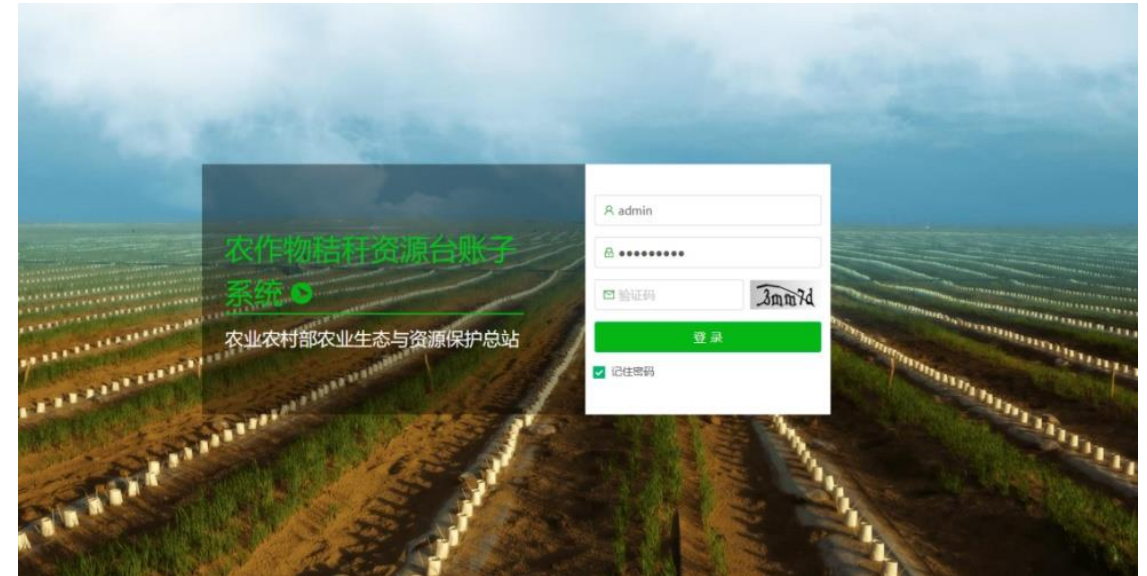
- ◆ In 2016, pilot programs of demonstration areas were launched in **10 northern provinces**.
- ◆ In 2019, **a nationwide comprehensive straw utilization initiative** was implemented.
- ◆ By the end of 2023, **over 2000 counties** had the demonstration sites for comprehensive straw utilization in China.

(3) Class and field training

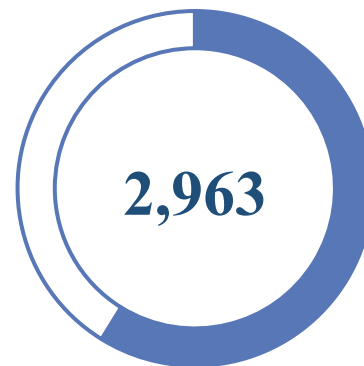


2.5 Exchange and sharing of monitoring data

- ◆ A **national straw resource system** covering 13 major crops has been established.
- ◆ Next step: Promoting the **integration of international straw resources**.



Resource ledger



County-level units



Market entities



Sampled farming households

Pilot site for integrated straw management in Qingdao, China



Straw used as ...



Returning straw, cow manure, or biogas residue and slurry to the field.

Fertilizer

①

New Energy Resource

③

Biogas Production



Fodder

②

Ensilage Maize

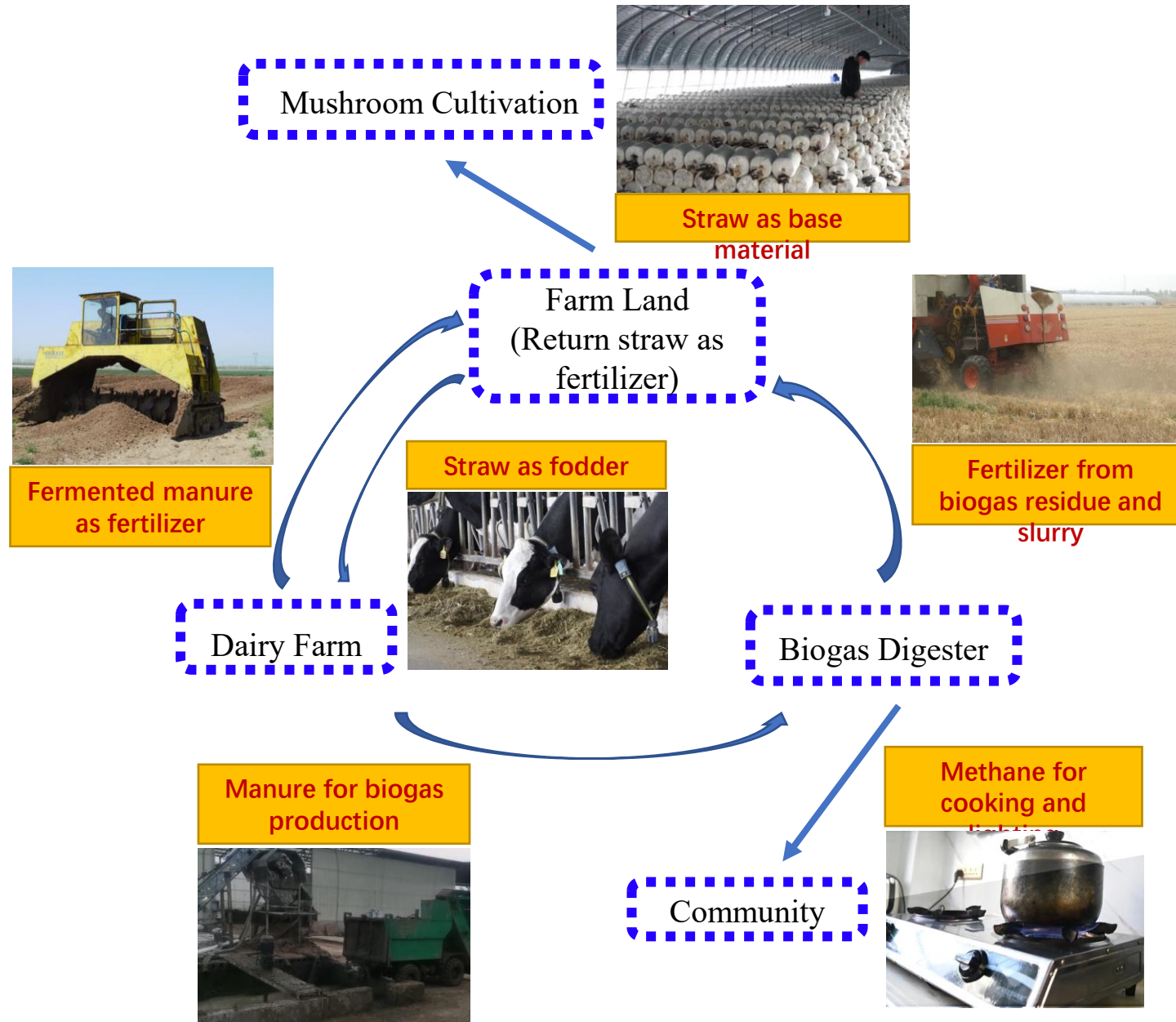
Base Material

④

Mushroom Planting

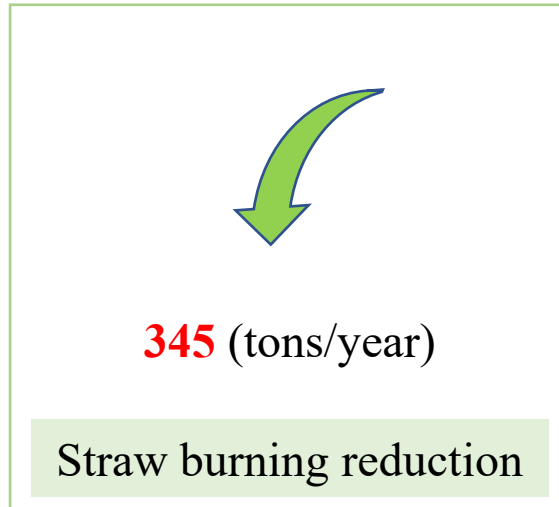
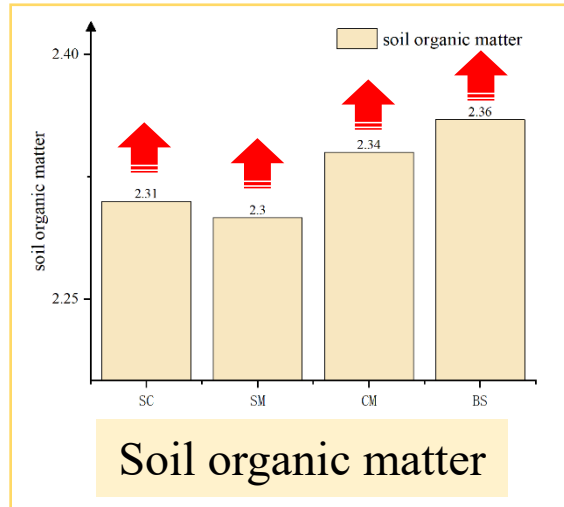


Circular agriculture model



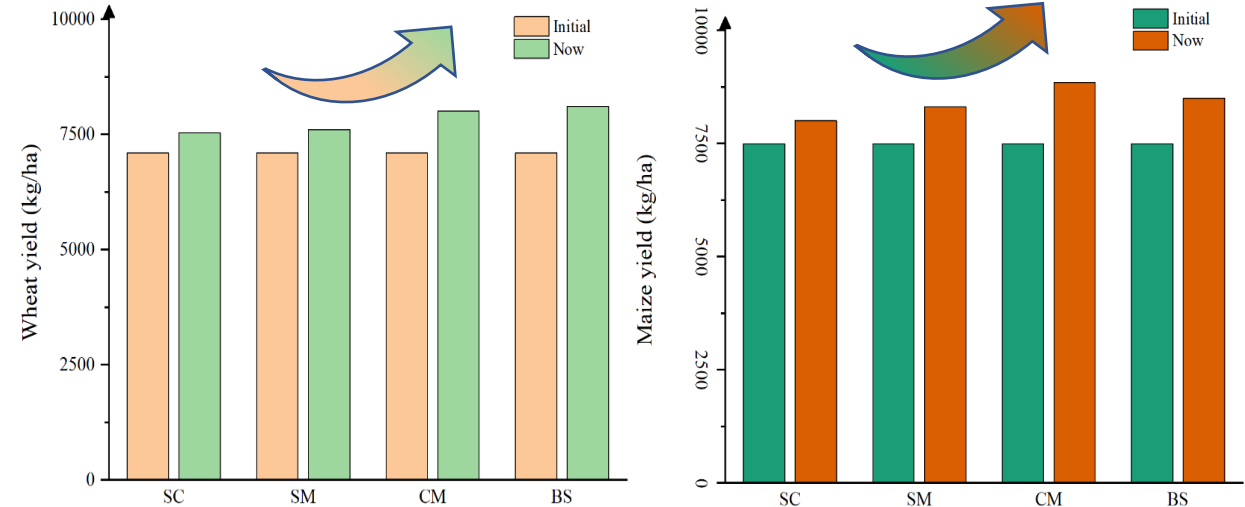
Results and outcomes

Ecological Indicators



- **Soil organic matter** was **increased** with the integrated management of straw.
- 345 tons of **straw were utilized** per year instead of burning.

Economic Indicators



- The maize and wheat **yields increased**.
- **Milk production** for the new fodder with catalytic enzyme **increased about 14%**.

Field demonstration and training for the promotion of technologies

◆ 4 times field demonstration and training were organized since 2020.



Thanks!

