



Positive Development of Conservation Tillage Technology for Sustainable Development of Agriculture

**Henan Agricultural Machinery
and Management Bureau**



Leaders, experts , friends and everybody,How are you !

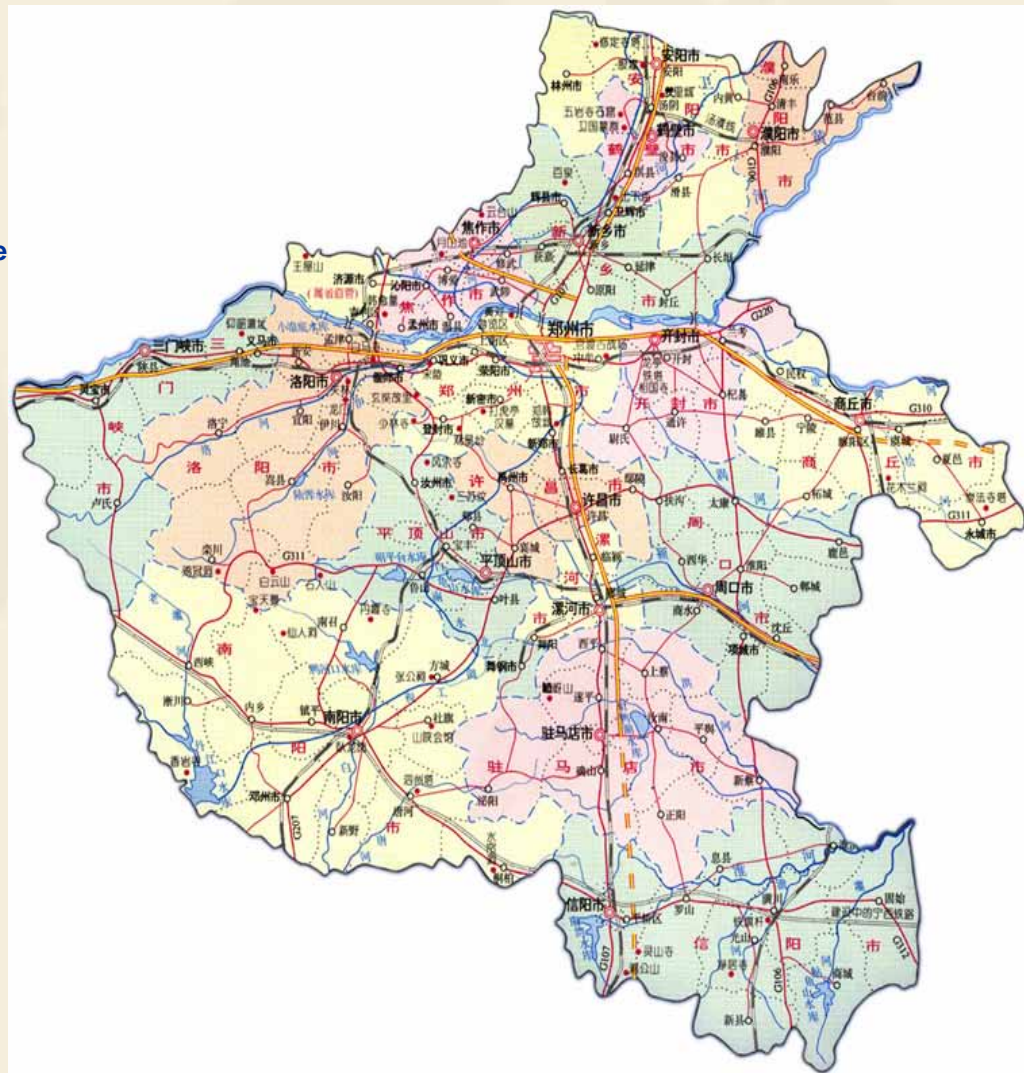
The International Seminar on Development of Asia-Pacific region's Conservative Farming is being Held in Zhengzhou, Henan Province, the seminar gives us with a very good learning opportunities. Here, I am expressing my sincere congratulations on behalf of Henan Agricultural Machinery Bureau. warm welcome the Asia-Pacific experts and friends! And may I take this opportunity to report the development of conservation tillage of Henan province.

1. Henan's development of conservation tillage conditions and ideas

Henan Province is located in the heart of China, Across the Yangtze River and Huanghuaihai, the province's population of 98 million, is number one in china, has arable land of 726.28 thousand hectares, rank third in china, is also a major agricultural province. In this vast land of the Central Plains, the development of conservation tillage is undoubtedly improving the ecological environment and promoting sustainable agricultural development and has an important value and broad prospects.



Henan has good conditions for agricultural development, but also the favorable environment for developing agricultural mechanization. The fixed assets of province's gross agricultural machinery have reached over 50 billion yuan, more than 84 million kilowatts, tractors total more than 330 million units. The province's comprehensive mechanization level has reached 52%. High demand on the labor-substitute production links have basically realized mechanization, that of wheat Mechanization level is 90%. Under a conditions of a certain level of mechanization, developing conservative tillage technology focused on Agricultural machinery has the basis of both farmers awareness, but also the reality of strong material foundation.



Henan has fertile land and rich agricultural resources, and high level of grain production. For two consecutive years the province's grain output exceeded 100 billion Jin, is China's only one provinces of more than 100 billion Jin. One quarter of the country's wheat was produced here, here, is China's granary. Grain production in Henan Province plays a very important role in our country's grain security. In this developed areas of agriculture, to promote the conservative tillage tillage technology, is still not at the expense of yield per unit area, “decrease cost and increase Id“ is a prerequisite and not merely efficiency.



Henan is the birthplace of the Chinese nation, also the origin place of traditional farming civilization, agriculture intensive cultivation model has a long history. In this ancient land, the development of conservation tillage technology is not only a revolution of agriculture farming system, along with a conceptual revolution.



Henan has various crops, varied cultivation methods and high multiple crop index. The development of conservation tillage must be in line with local conditions, to integrate the mature technology at home and abroad with the agricultural production conditions in Henan Province, to innovative explore the development model of conservation tillage suited for a situation of Henan.



Work Ideas and Principles of Conservation Tillage Development in Henan

1. Pay attention to the media first, strengthening publicity, emancipating our minds, breaking conceptual obstacles, meticulously creating an advanced cultural rural farming atmosphere.

ere.

g of comprehensive promotion based on a stable yield.

eld.

and demonstrations, as well as to pay greater attention to water and fertilizer region, , to meet Henan's vast land, different agricultural production conditions and the high water and fertilizer regional characteristics, Comprehensive advancement on both irrigated land and dry land.

and.

ative tillage technology model of wheat - corn, wheat - soybeans and other crops.

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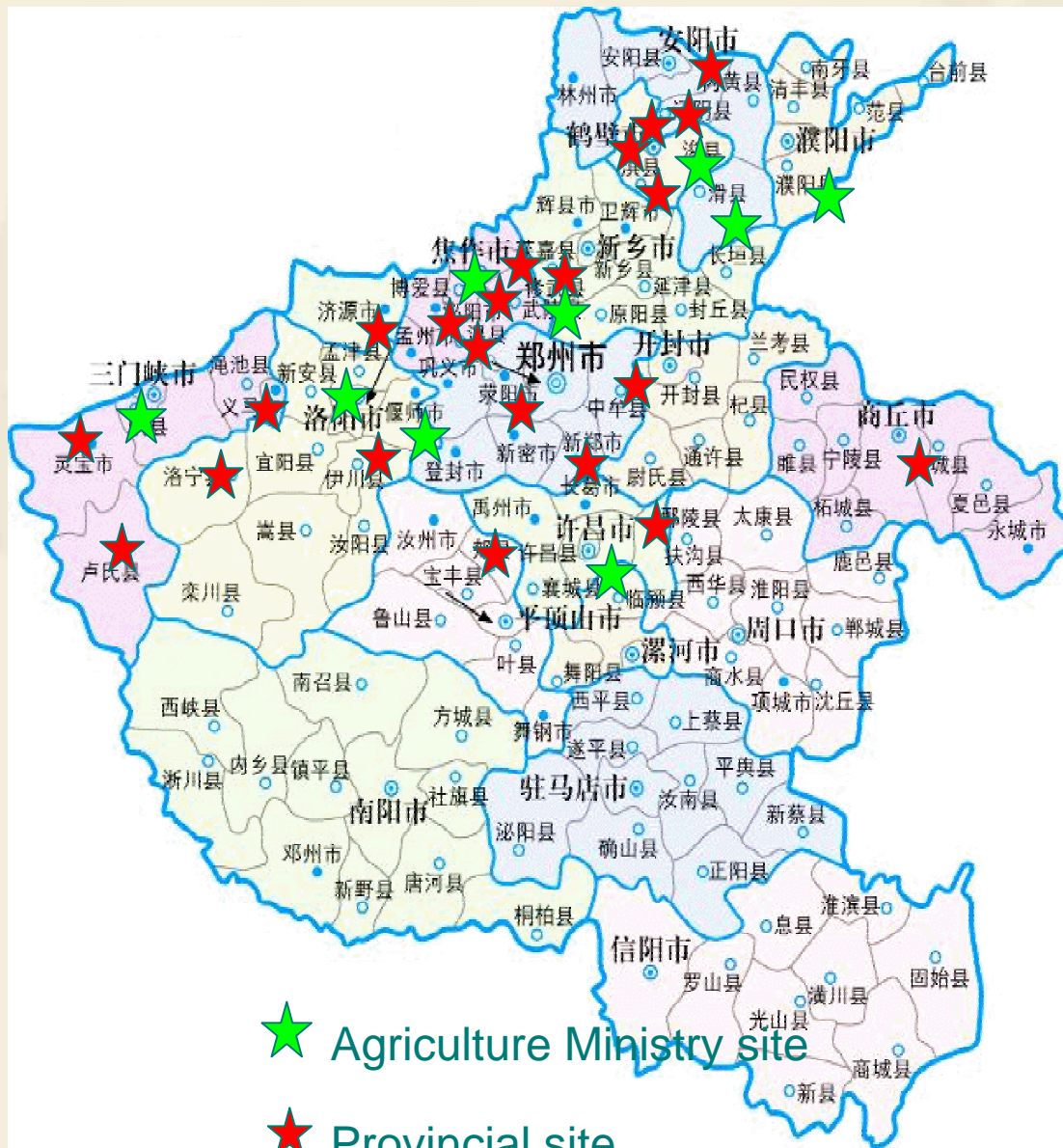
y of choosing regions for experiment and demonstration is based on local government attention, a strong scientific and technical sense of farmer, and where or not fast accepting new things.

ngs.

2. Henan implementation of conservation tillage

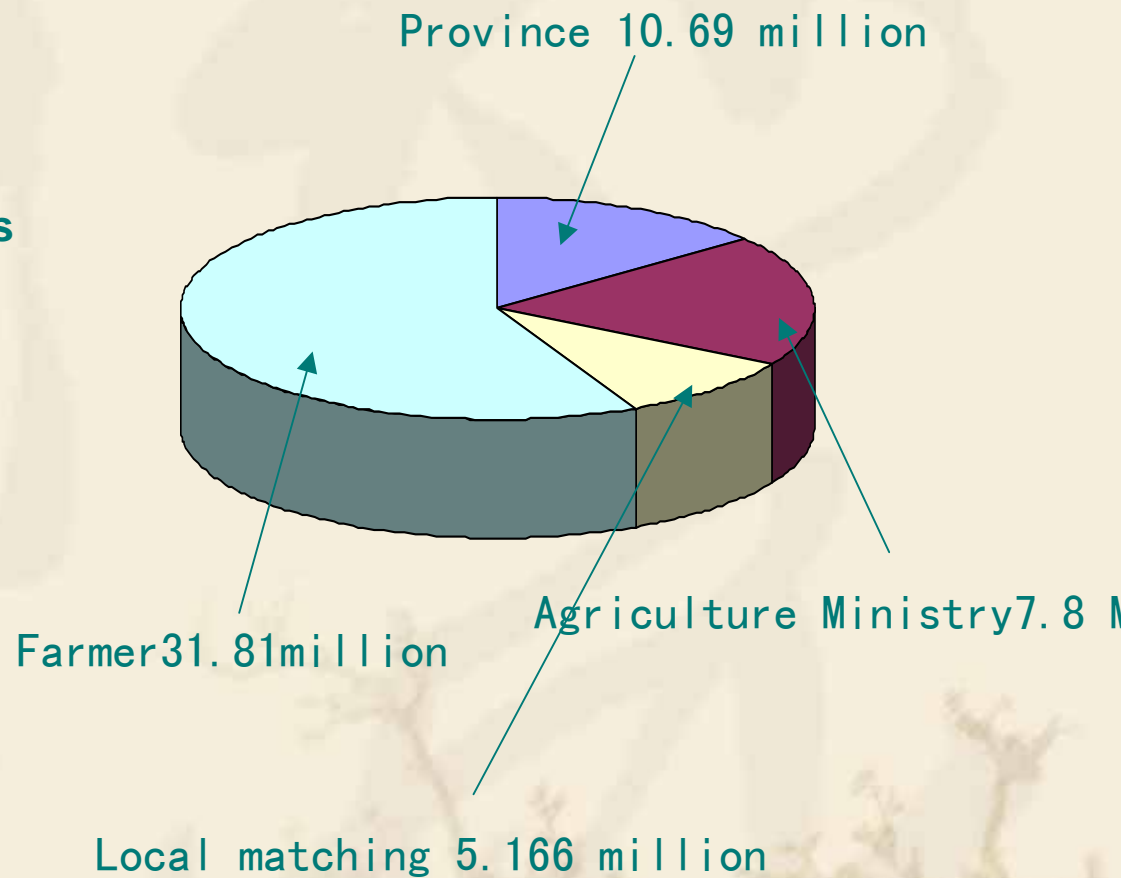
Henan began its conservative tillage tests on the basis of a certain farmer's acceptance. 2002, in view of demonstrations were carried out by Ministry of Agriculture in the north part of China, and also in view of application will of some farmers engaged in trans-regional operations of farm implements, through the exchange of information, so our province allocated special funds, we initiated the conservative tillage demonstration in Longan district of Anyang City, Liangyuan district of Shangqiu City and Xinzheng of Zhengzhou city, In the same year, Wuzhi and Mengzhou of Jiaozuo City also launched experiments.





In 2003, some counties were included in experiments and demonstrations area by Agriculture Ministry. After that, the Agriculture Ministry and the province increased funds year after year, and expanded the scope of experiments and demonstrations. From 2002 to 2007, we have built 56 counties of conservative tillage projects, covered 12 provincial cities. That of 10 projects belong to Agricultural Ministry, 27 projects belong to province level, 19 project belong to city or county level. covered 86 million mu, extended to over 2 million Mu. The province has added all kinds of conservation tillage machines more than 6,000 units.

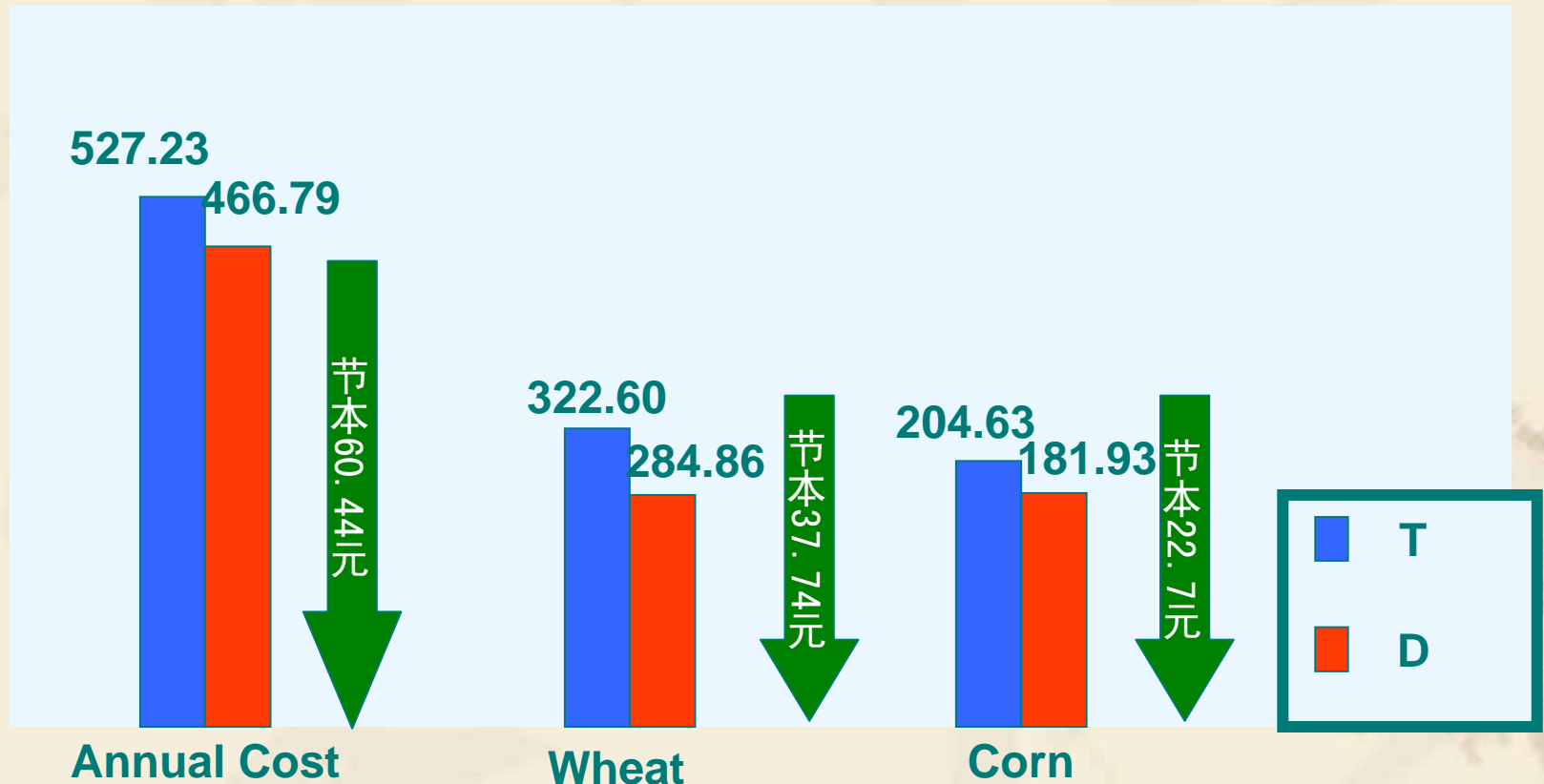
Over the past six years, the province has invested 55.466 million yuan, that of agriculture ministry 7.8 million yuan, province financed 10.69 million yuan, all levels of local financial matching 5.166 million yuan, the farmers invested 31.81 million yuan. 2007, conservation tillage was included in the provincial financial budget in form of special funds, this created a favorable security conditions for promoting the sustainable and rapid development of conservative tillage.



3.The Results

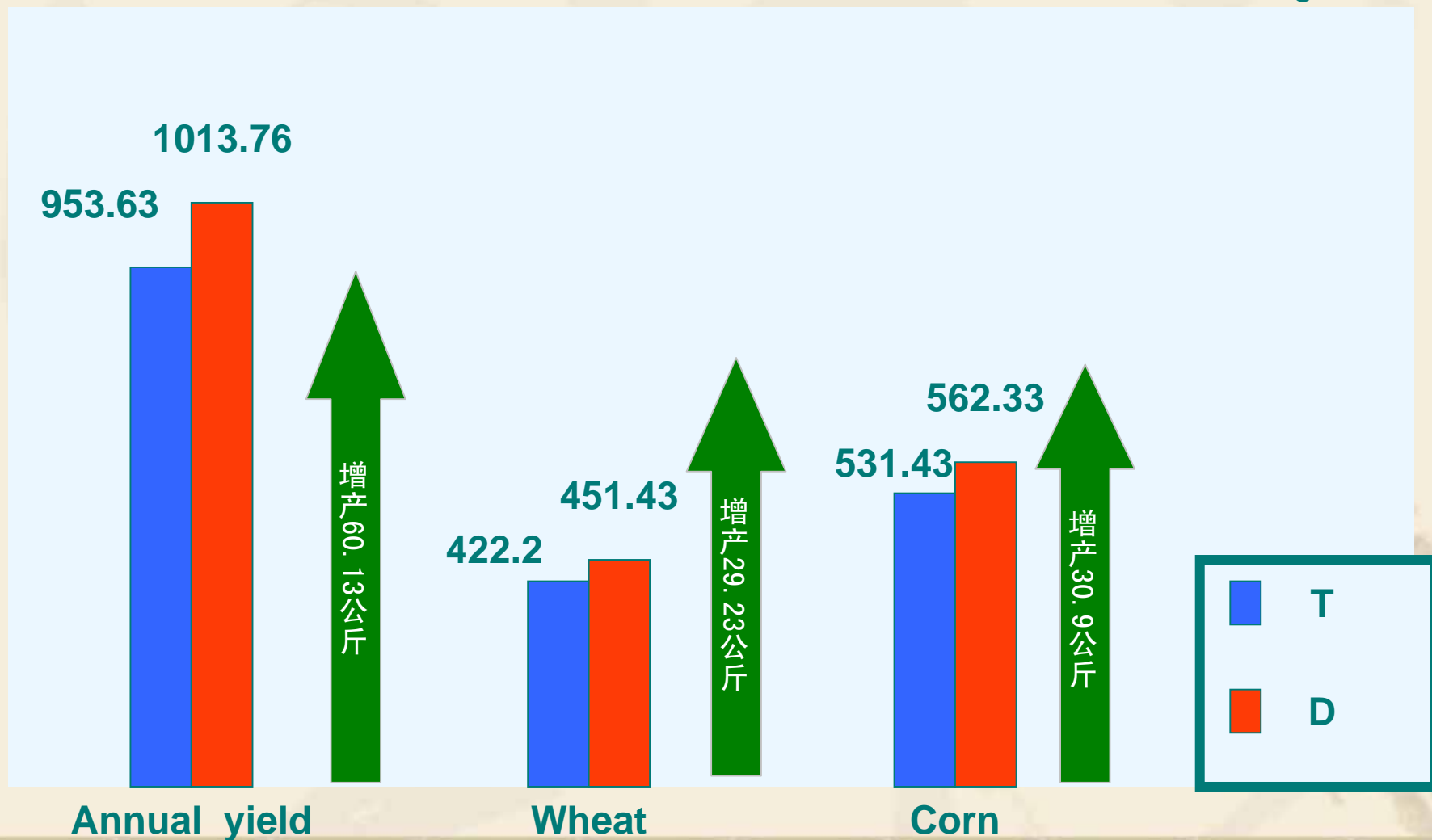
First,Reduced operating links, and lowered the cost of production. Over the last six years, a total 78.1445 million yuan of production'costs were saved in project areas.

Unit: yuan / mu



Second, Increased production, improved agricultural efficiency. A total 75.4058 million kg of grain yields were increased in project areas.

Unit: kg / Mu



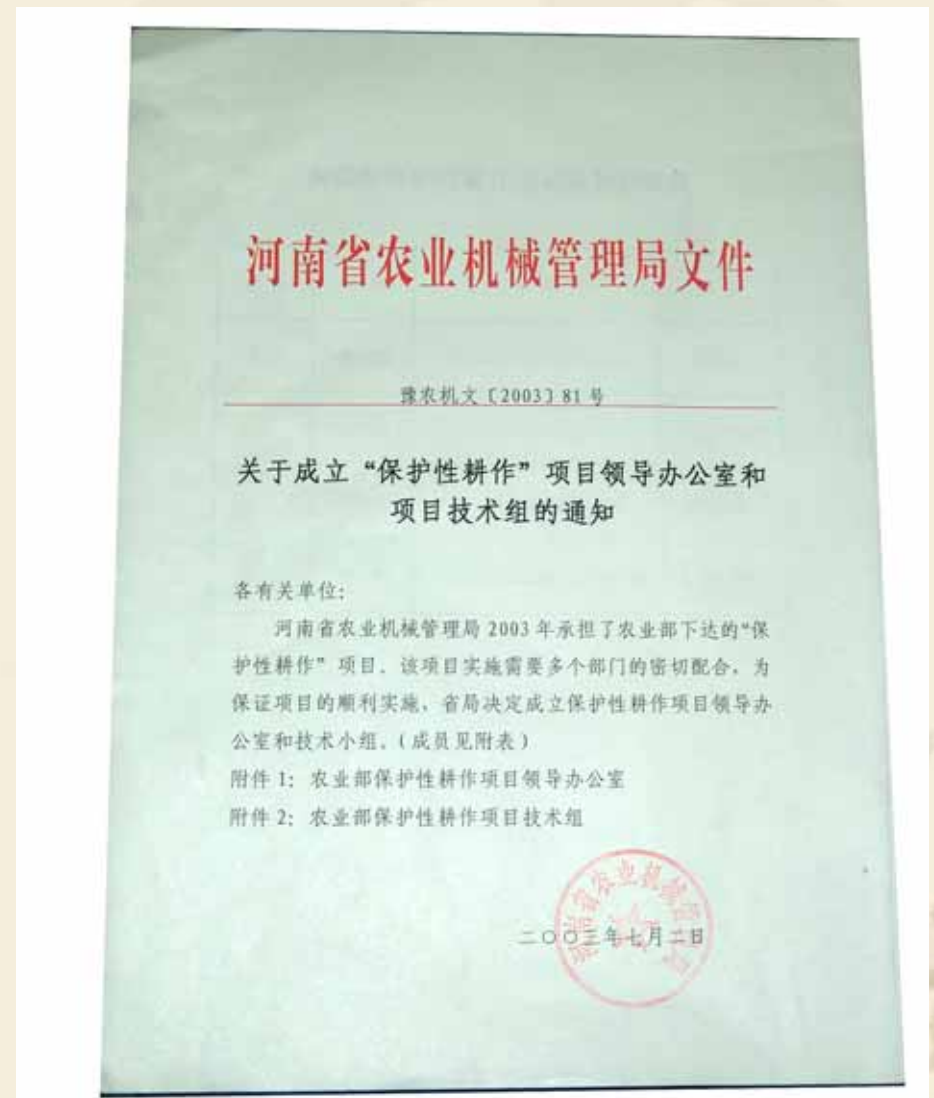
Third, Improved operational efficiency, advanced farming season. Conservation tillage without soil preparation link, sowed directly, ensured a favorable time for timely sowing. Particularly from 2003 to 2005, rain lasted a long time during our provincial wheat sowing period. Conservative tillage had a characteristics of rapid harvesting and rush sowing. Fit sowing dates had not been affected by unfavorable weather conditions, and welcomed by the majority of farmers.



4. Main Measures

4.1 Strengthening Project Management

We established project management office headed by deputy director of provincial agricultural machinery bureau who was in charge of, comprised managers of related departments. In accordance with the principles of the unified planning, division of labor and cooperation, a clear mandate and accountability, we organized and conducted the project's implementation and management.



The project counties(cities or districts) have established leadership office respectively, the leadership office headed by the deputy head of county who was in charge of agriculture, comprised the manager came from agricultural machinery management bureau, agricultural bureau, financial bureau and related rural and township government. The leadership office was responsible for coordinating, funding, personnel, technology, farm implements, supply of agricultural materials,etc.



4.2 Strengthening technical guidance

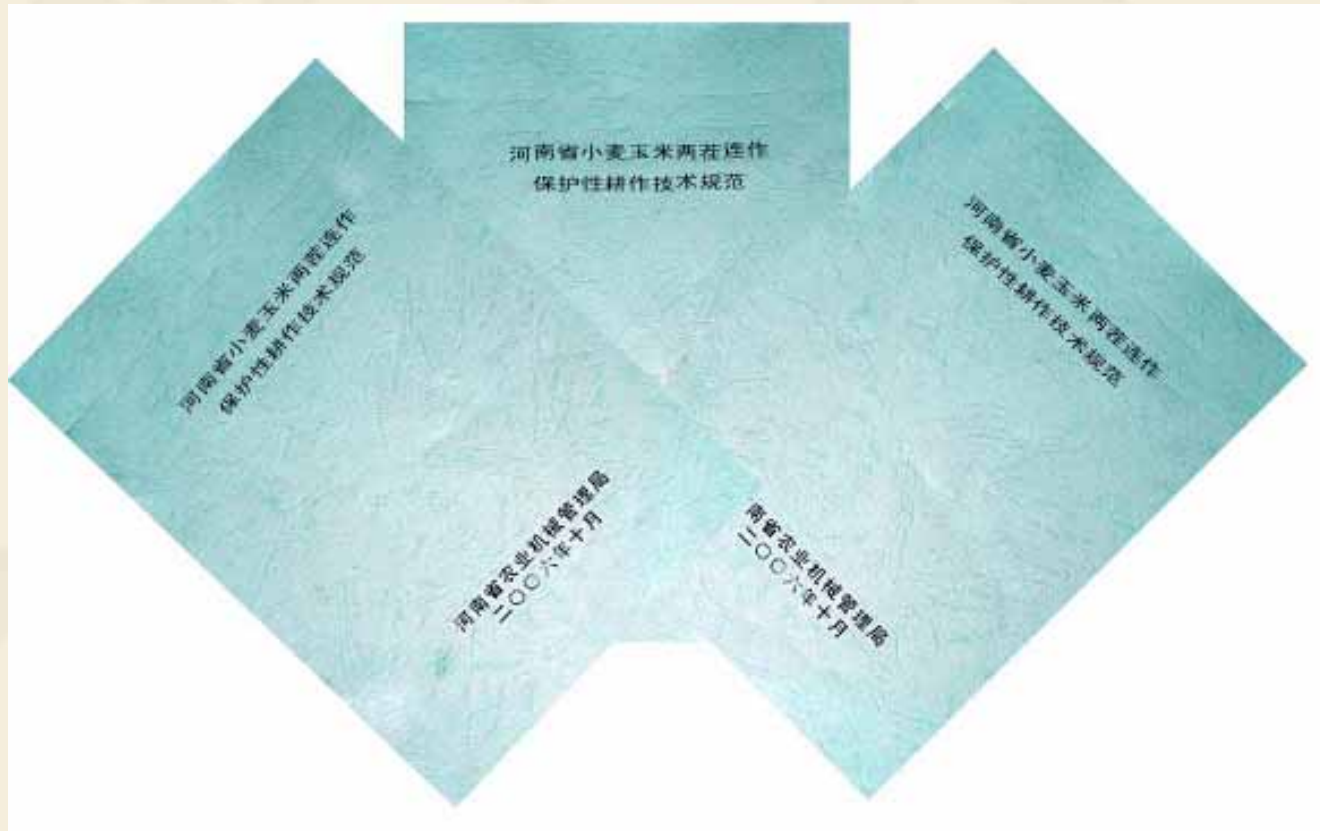
(1) Found an expert group, the member of the expert group came from agricultural machinery, agricultural agronomic, seed, soil, fertilizer section. Expert group was responsible for the technical guidance and training.



(2) Formulated “Conservative Tillage Testing and Operating Standards of HeNan Province”, “The Operation Rules of Conservative Tillage Machine of HeNan province”.



(3) summarized “The technical standards of conservative tillage of wheat-corn within one year”, provided technical support for sustainable and healthy development of our provincial conservative tillage.



(4) Conducted a comprehensive and meticulous technical testing work. Began from 2002, arranged 4 monitoring sites, tested the results of conservation tillage techniques, monitored changes of soil moisture, organic matter content, crop pests and diseases, crop yields, soil physical and chemical indicators in accordance with the different technical model.





Soil moisture, organic matter, bulk density sampling test



Wheat tiller test



Wheat basic seedling test



Wheat yield test

Survey wheat growth

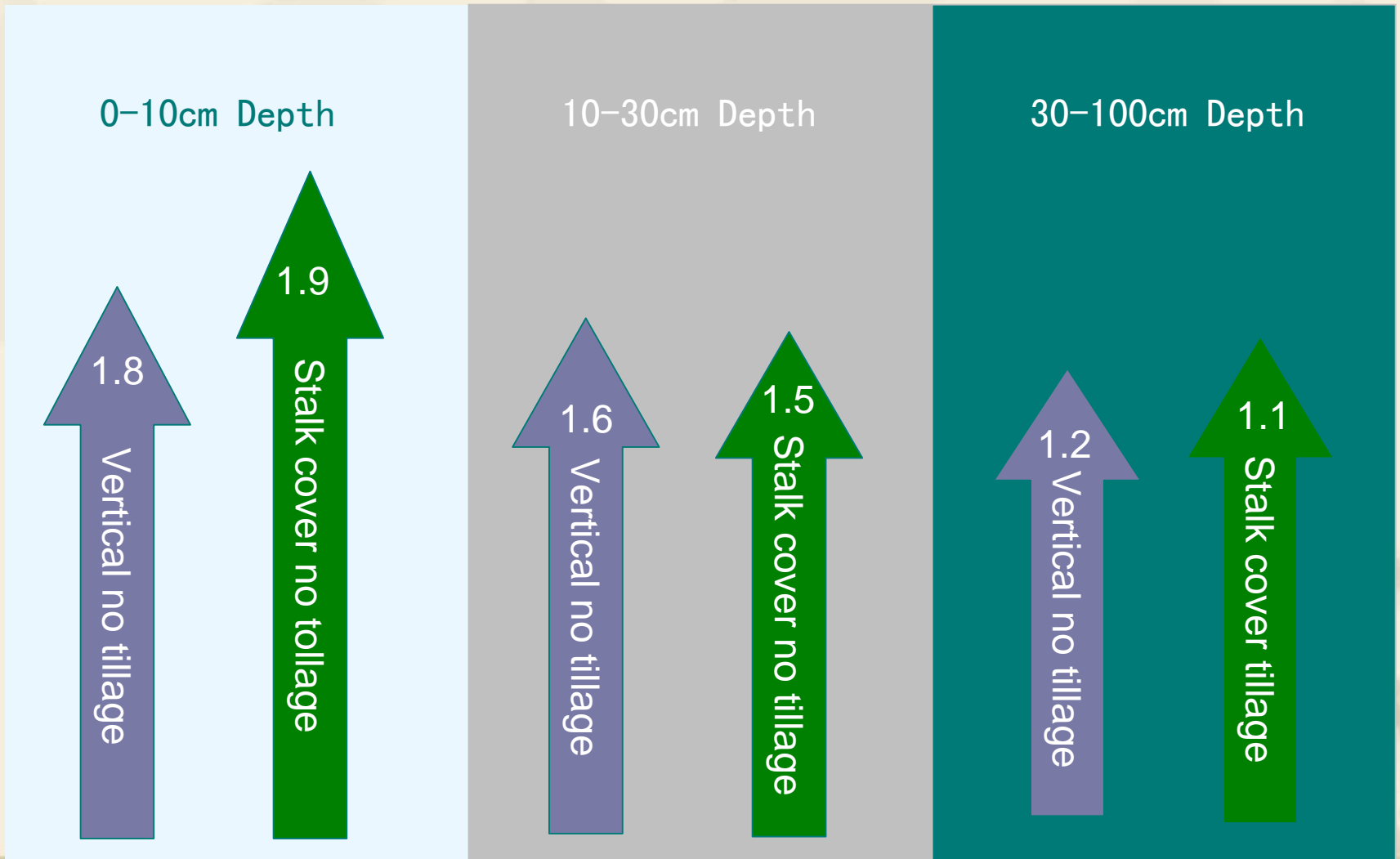
List of changes in soil moisture content

Unit:%

Soil Depth (cm)	Planting Pattern	Test Time								Compare with traditional
		2004-10-4	2005-6-11	2005-7-8	2005-9-15	2005-10-6	2006-6-5	2006-7-8	2006-9-15	Add
0-10	Vertical No- tillage	13.1	13.62	14.37	14.78	15.2	11.6	13	13.8	1.8
	No- tillage	15.6	13.35	14.6	14.8	15.5	11.4	12.8	13.9	1.9
	Traditio nal	16.2	12.5	13.1	12.31	14.9	11	12.5	12	
10-30	Vertical No- tillage	14.6	13.1	13.2	14.32	15.3	12.5	13.3	12.6	1.6
	No- tillage	15.1	13.35	14.71	14.62	15	12.9	13.2	12.5	1.5
	Traditio nal	16.11	12.13	12.9	12.62	14.1	11.6	12	11	
30-100	Vertical No- tillage	13.7	13.73	14.19	13.1	14	12.4	12.1	13.1	1.2
	No- tillage	15.1	13.1	13.6	13.6	13.9	12.6	12.6	13	1.1
	Traditio nal	13.2	12.1	13.1	13.1	12.9	11.2	11.4	11.9	

Changes in soil moisture Graph

Unit:%



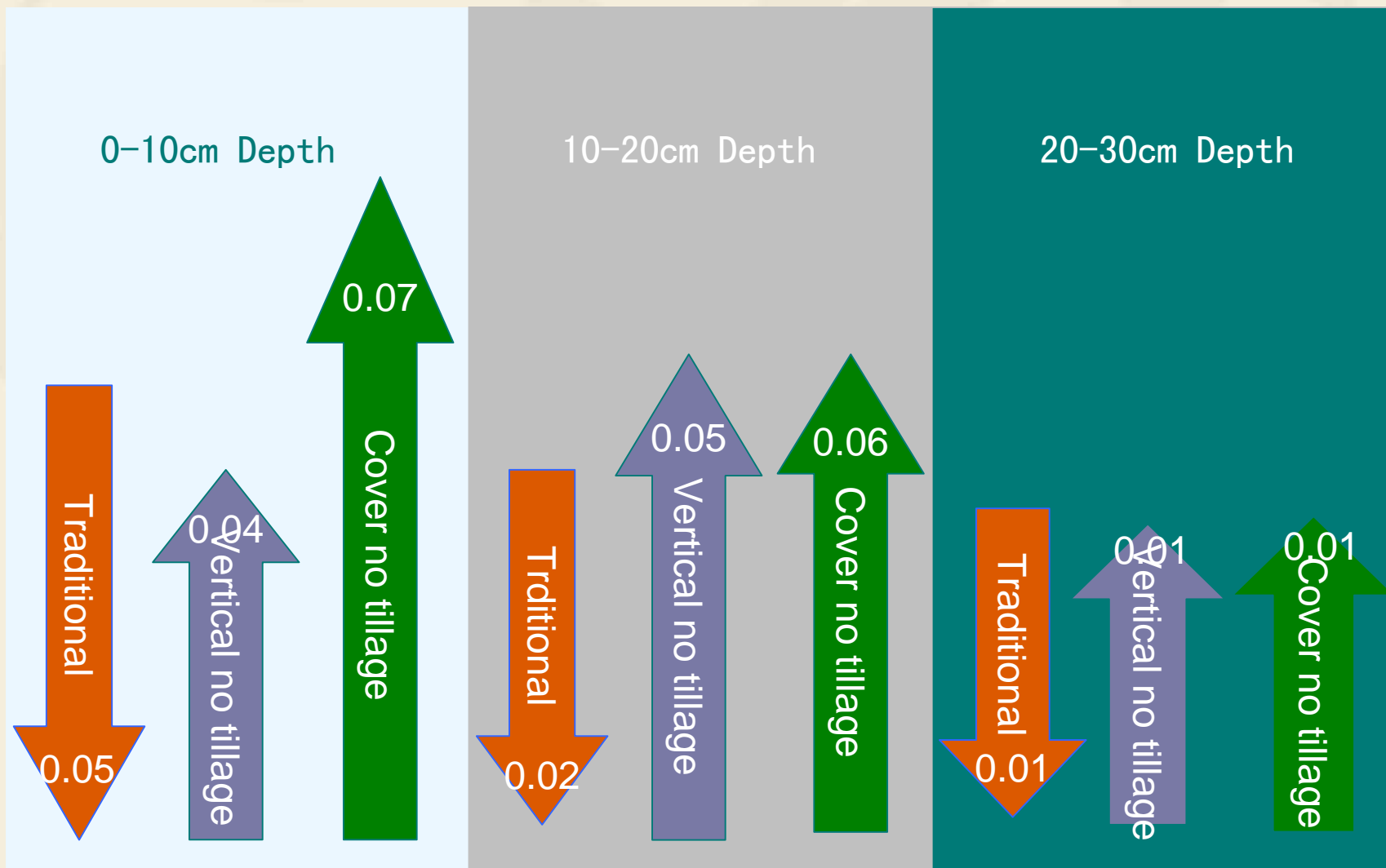
List of changes in soil organic matter

Unit:%

Test Date Y-M-D	Soil organic content %								
	0-10cm			10-20cm			20-30cm		
	Traditio nal	Veretical no-tillage	Cover no tillage	Traditio nal	Veretical no-tillage	Cover no tillage	Traditiona l	Veretical no-tillage	Cover no tillage
2004-10-4	1.46	1.36	1.45	1.2	1.28	1.27	0.95	0.93	0.91
2005-6-12	1.56	1.37	1.43	1.22	1.3	1.27	0.95	1.01	1.01
2005-9-30	1.47	1.39	1.46	1.2	1.26	1.28	0.94	1.09	1.1
2006-6-13	1.44	1.39	1.49	1.19	1.31	1.3	0.94	0.93	0.92
2006-9-20	1.41	1.4	1.52	1.18	1.33	1.33	0.94	0.94	0.92
Incremental	-0.05	0.04	0.07	-0.02	0.05	0.06	-0.01	0.01	0.01

Graph of Changes in Soil Organic Matters

单位:%

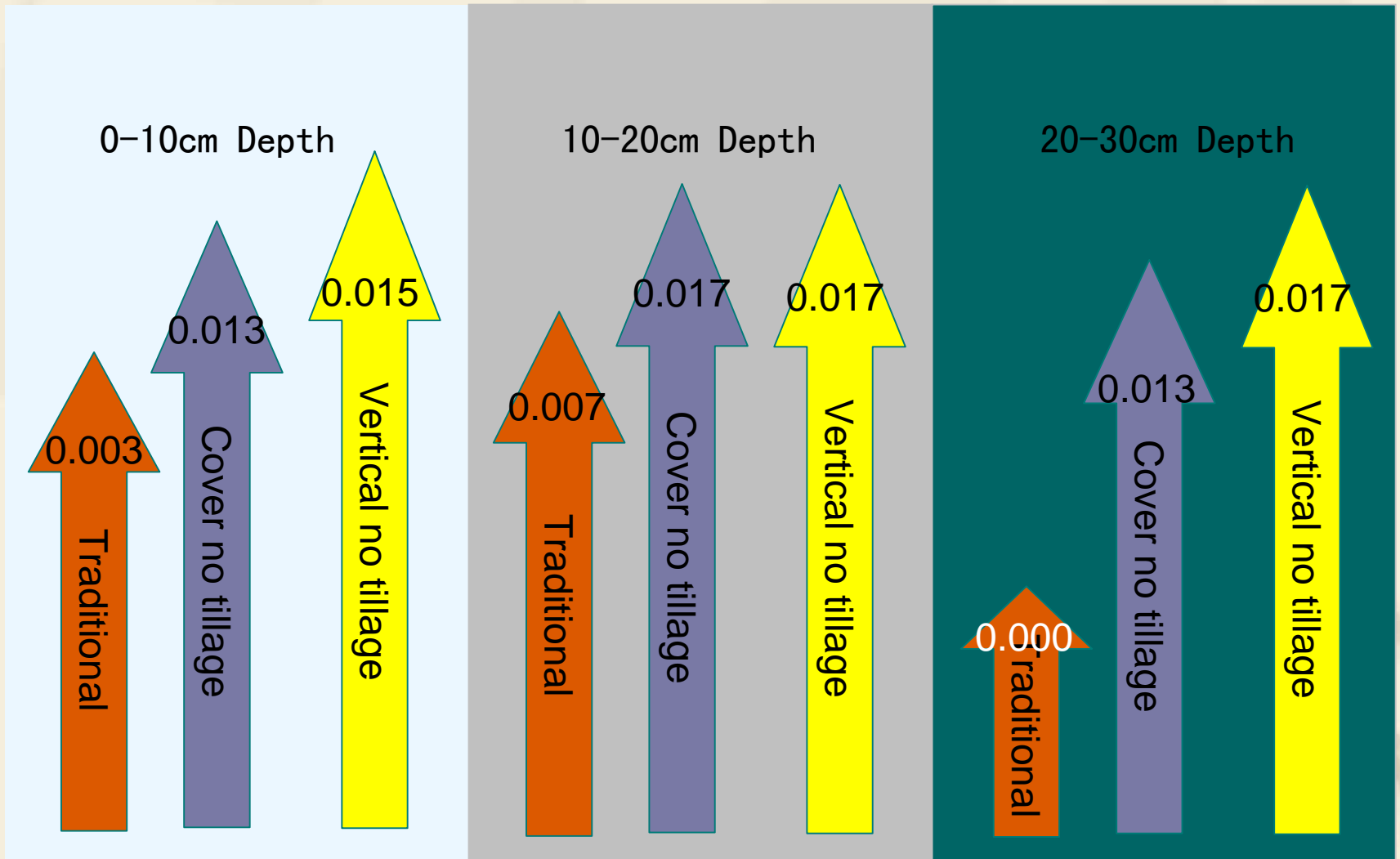


List of soil bulk density changes

Soil Depth (cm)	Tillage Pattern	Test Date			
		After wheat harvest 2005-6-12	After corn harvest 2005-9-23	After wheat harvest 2006-6-13	After corn harvest 2006-9-28
0-10	Cover no tillage	1.38	1.39	1.39	1.40
	Vertical no tillage	1.35	1.36	1.36	1.37
	Traditional	1.36	1.36	1.37	1.36
10-20	Cover no tillage	1.39	1.41	1.40	1.41
	Vertical no tillage	1.38	1.39	1.40	1.40
	Traditional	1.39	1.41	1.39	1.41
20-30	Cover no tillage	1.41	1.43	1.42	1.42
	Vertical no tillage	1.42	1.43	1.43	1.44
	Traditional	1.46	1.47	1.45	1.46

Graph of soil bulk density changes

Unit:g/cm³



Crop growth conditions

(1) Wheat growth conditions

Test results show that: The numbers of effective tillers of conservative tillage are greater than traditional farming, Mu panicles more than 1 000 ~ 10 500, one grain number more than 1 ~ 3, Thousand-grain weight more than 0.5 ~1.0 gram, mu yield more than 29.23 kg.





Different growth periods of conservative Tillage wheat

(2) Corn Growth Condition

Compared with traditional farming, conservative tillage has more grain number 9-41, more thousand-grain weight 3-16, add mu yield 30.9 kg.



Conservative Tillage

Traditional Farming



Different growth periods of conservative Tillage Corn

Technology model and routes for Wheat - corn growing with in one year



Combine harvest corn
While stalk smashed and covered



Manual harvest
Stalk smashed and covered



Combine harvest wheat



Mechanical plant protection



No tillage drill sow wheat and fertilization



Mechanical subsoiling (1 in 3-5years)



No tillage drill sow corn fertilization



Mechanical plant protection



(5) Improved and innovated technology. 2005, began comparative test study on wheat - corn (soybean), wheat - soybean growing within one year on conservation tillage techniques , no-tillage even sowing on equal space for wheat and corn, no-tillage narrow –wide furrow sowing for wheat and soybean, equal space no-tillage sowing for wheat and soybean were experimented.



Technology model and routes for Wheat - soybean growing with in one year



Plant protection



No tillage drill sow wheat and fertilization



Combine harvest soybean
Stalk smashed and covered



Combine harvest wheat



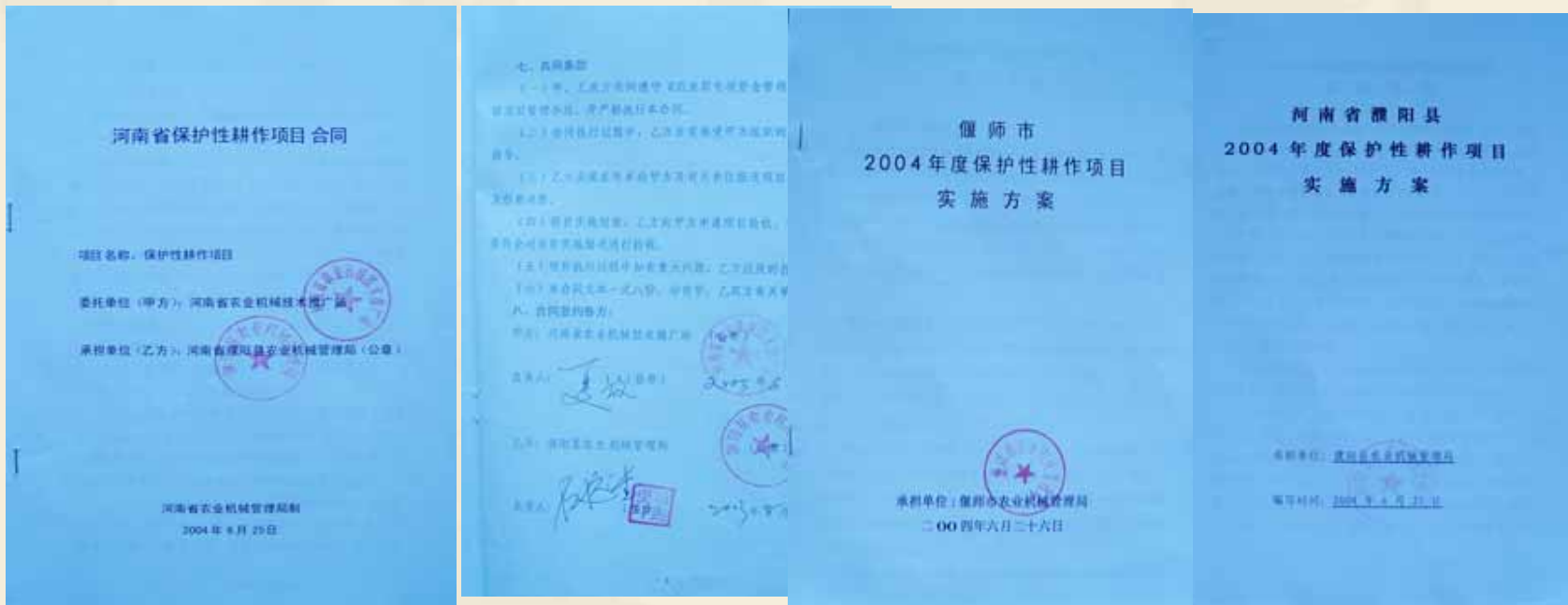
Mechanical subsoiling (1 in 3-5year)



No tillage drill sow soybean fertilization

4.3 Grasp key links

First, Sign project contract, review the implementation of programs, carry out objectives, clear and specific measures, ensure that project funds in place in time, earmarking.



Second, Earnest machine's Selection. Wheat no-tillage drill is the key machine of implementation of conservation tillage, According to the "Reference directories of Conservative Tillage Implements" issued by Agricultural Ministry, Arranged technicians to choose useful farm implements after weighing comprehensive technical and economic quota of various conservative tillage, such as technical indicators, adaptability, reliability, price, while went to machinery manufacturing companies to examine on the spot.

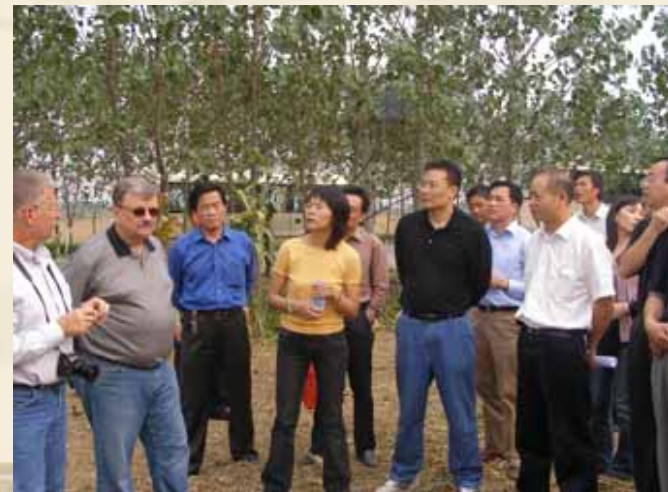


2BMXS-3/10 intelligent no tillage fertilization Drill

2BMSF-12/6 no tillage fertilization drill

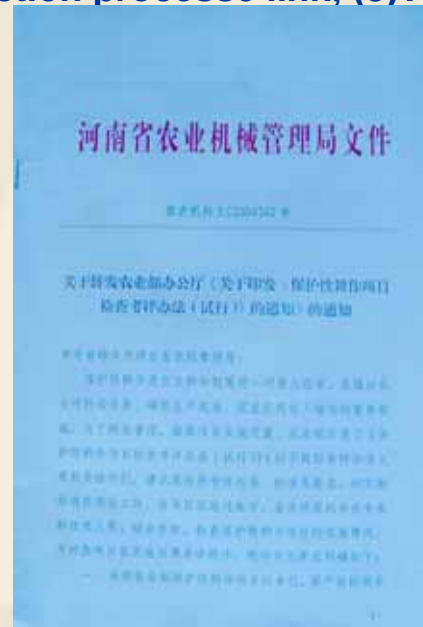
2BMXS-3/10 digital no tillage fertilization drill

Third, Checked, supervision and guided on the Spot. (1) on the spot guided and supervision for production processes links; (2) checked and guided for the day-to-day work.





Fourth, Seriously organized the project evaluation and acceptance:. (1)enacted and issued check and evaluation methods; (2) checked in terms of production processe link; (3)The annual evaluation and acceptance.



4.4 Earnest grasp publicity and training

First, Created atmosphere. Used various medium, launched a multi-level, all-dimensional and wide viewing angle propaganda and training programs, organized presentations 518 times, 136 690 participants, printed public materials 1.347 million copies, 1575 times media campaign, issued 15 000 VCDs.







Second, Grasp technical training for city and county's extension technical personnels and rural and village cadres of project areas.



Held 10 provincial-level training courses, trained 1500 city and county's technicians





Held 1120 city and county-level training courses, trained 67200 person-times technicians of county,rural and village



Third, Publicity and training focused on both the large agricultural machinery family and agricultural machinery Cooperation Organization.



4.5 Insisted on Combining Agronomic with agricultural machinery

We insisted on combining agricultural machinery with agronomic, took the initiative to coordinate with experts of agricultural technology, soil and fertilizer, plant protection, seeds, etc, with other technical personnel, in order to make implementation of the project more scientific.



5.Results and impressions

5.1 Trained the core members.

Through extensive publicity and training, a large number of farm machinery management personnel, technical personnel, county, township and village cadres, agricultural machine users and big machine families mastered conservative tillage technology, formed the backbone of conservation tillage forces

5.2 Explored technical model.

Insisted on combination of agricultural Machinery and agronomic, demonstration in line with local conditions, summed up and explored the conservation tillage technology system and model suited for the characteristics of agricultural production of our province.

5.3 Introduced suitable farm implements

After the introduction of technology, technological breakthroughs and continuously improvement, in our province, breakthroughs and progress were made by R&D of professional farm implements such as wheat no-tillage drill ,etc. 2BMXS-3/10 intelligent no tillage fertilization drill, 2BMSF-12/6 no tillage fertilization drill, 2BMSF-12/6 no tillage fertilization drill, 2BMXS-3/10 digital no tillage fertilization drill, 2BMDF-10 smash low bank no tillage fertilization drill, etc, manufactured by Xuchang Haofeng machinery manufacturing corporation, were welcomed by farmers.



2BMSF-12/6 No tillage fertilization drill



2BMDF-10 Smash low bank no tillage fertilization drill

5.4 Optimized the organization and service model

First,Unity service model: Village group as a unit, through lease, contract, the Organization for buying seeds, unified fertilization, unified operations.

Second, Model-inspired model: Village cadres took the lead, demonstration drivers guided farmer, and driven villagers to implement.

Third, The development of automatic model: the owner of farm implements contacted, advocated friends and relatives. Initially established the conservation tillage social service mechanism of Henan province.

5.5 Accumulated management experiences.

(1) Insist on instructing separately according to local conditions. Following conservative tillage model suited for Henan province's condition.

(2) Insist on Combining farm implements with agricultural technology, enhancing integrating multi-suitable technology and application of matching technologies.

(3) Insist on following on order and advance step by step. serious following the step of “experiment—demonstration—extension” to lead the development of technology.

(4) Insist on coordinating the conservative tillage project with the local level of farm machinazation. Ensure that there are enough machine for implementation of conservative tillage.

(5) Insist on combining demonstration and extension with cultivate market, establishing long-effective machanism step by step.

(6) Insist on combining extension of conservative tillage technology with buying new machine' allowance, with corn harvest combine demonstration.

6. Problems and Suggestions

First, the technical model is not satisfactory. Our province has various species of crops and plant methods, The combination of agricultural machinery and agronomic also requires a process, need to continue to explore different technical model.

Second,Some of the key operational equipment's reliability is not high, function is not perfect enough.

Third, a long efective machanism is not established. The majority of regions still depend on government funds.

7. Conservation Tillage Development Objectives of Henan Province

The guiding ideas of future conservation tillage development of Henan province for a period: To establish a scientific development outlook, adhere to both economic and ecological benefits, technology and mechanisms simultaneously, upholding the government to promote integrated with the market pull. Adhere to combine the promotion of conservation tillage technology with buying new farm machines, combine with corn combine. Both dryland and irrigated land are Synchronous implemented, overall planning, in light of local conditions, and provide appropriate guidance, major breakthroughs, increased promotional efforts, and establish long-term effective mechanism and take the path of sustainable development of conservation tillage in Henan province.

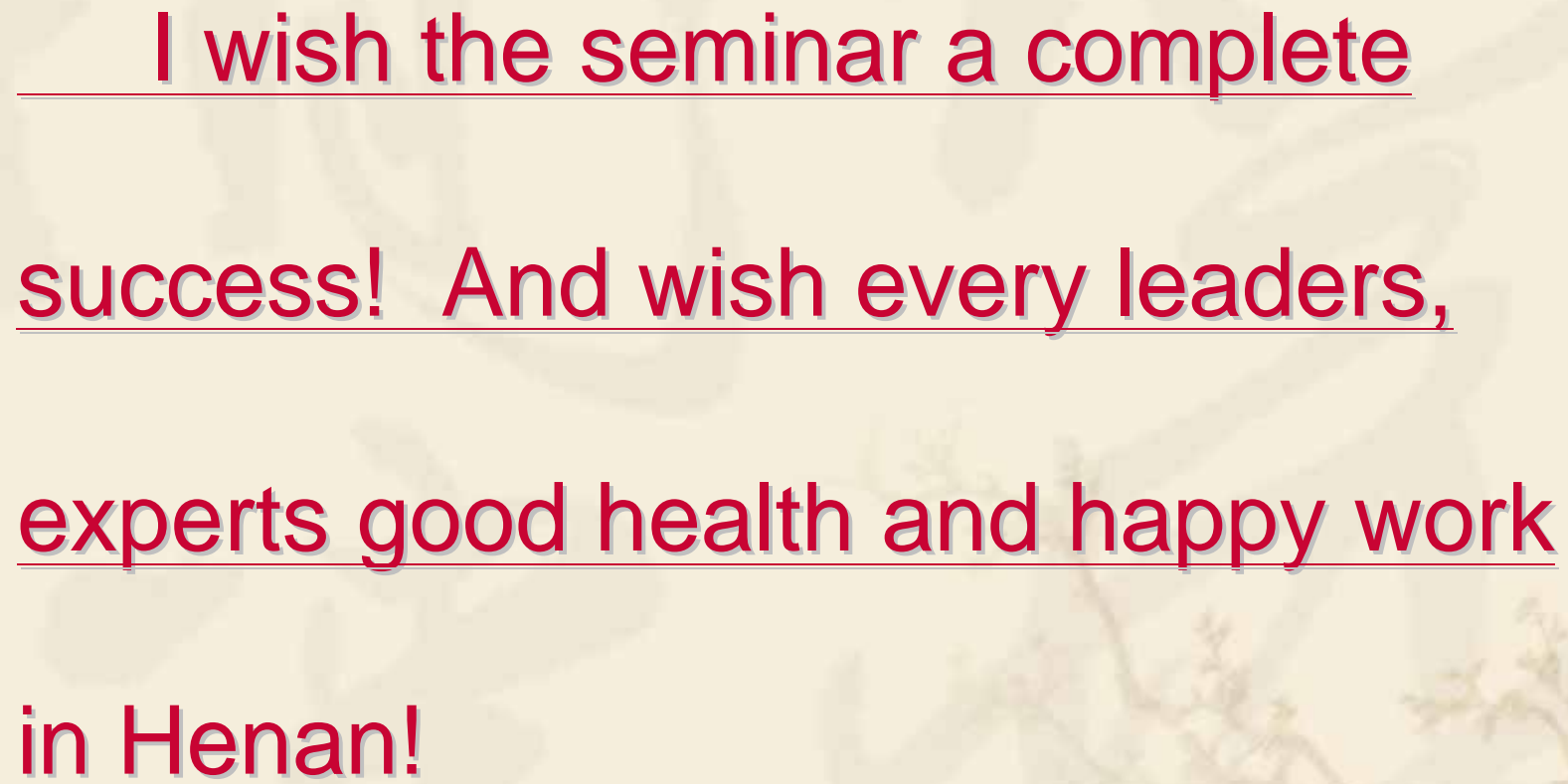

Development goals: The first is a regional demonstration stage, 2006-2010, add 40 new conservation tillage demonstration counties, add the new experiment, demonstration and test area of 1 million mu. Focus on 3-4 provincial cities with concentrated areas and notable demonstration effect. Through demonstration and promotion, aging technology, summing up experience, improving conservative tillage technology system, to provide technical support for a large promotion.

While to experiment and research the plant models of wheat –rice, wheat - Autumn miscellaneous grains, wheat - economic crops, to expand application areas.

The second stage is a large area application. 2011- 2015, the implementation land reach the area of 12 million mu. To give full play to radiation and leading role of demonstration zone, to largely promote conservative tillage technology, the implementation area

Reach 12 million mu.





I wish the seminar a complete
success! And wish every leaders,
experts good health and happy work
in Henan!

