## Excavated farmland with plastic mulching as a strategy in saving water and controlling soil salinization in dryland agricultural areas

Zengming Ke<sup>1</sup>, Xiaoli Liu<sup>2</sup>, Lihui Ma<sup>2</sup>, Qinge Dongle<sup>3</sup>, Feng Jiao<sup>2</sup>, and Zhanli Wang<sup>4</sup>

<sup>1</sup>Institute of Soil and Water Conservation Northwest A & F University <sup>2</sup>Northwest A&F University <sup>3</sup>Northwest Agriculture and Forestry University <sup>4</sup>State Key Laboratory of Soil Erosion and Dryland Farming on the Loess Plateau, Institute of Soil and Water Conservation

January 8, 2022

## Abstract

Water shortage and soil salinization in gully farmland comprising sediment deposited farmland (SF) and excavated farmland (EF) have become a widespread concern in the loess hilly region. A two-year field experiment was conducted to assess the soil water content (SWC) and salt content (SSC) and their effect on the spring maize yield and water use efficiency in SF and EF. Eight treatments comprising flat cropping without mulching (1), ridge planting without mulching (2), ridge planting with plastic mulching (3), and ridge planting with straw mulching (4) were tested in the SF and EF plots, respectively. The results showed that the yield was higher in SF than EF, whereas the water use efficiency was significantly higher in EF because the bottom water flux was 117.4% higher in SF than EF (P < 0.01). A significant positive correlation was found between the average SWC and yield (P < 0.01), thereby indicating that the yield was severely limited by the SWC. Thus, the higher water use efficiency in EF has important implications for alleviating water scarcity during agricultural production in this region. The risk of soil salinization was decreased greatly by treatment 3 where the SSC was decreased in EF and SF were 0.09 g kg–1 and 0.08 g kg–1, respectively. In addition, treatment 3 had the most significant impacts on the yield and water use efficiency. Our study provided appropriate land type and effective tillage measure for the sustainable development in dryland agricultural areas.

## Hosted file

Manuscript.docx available at https://authorea.com/users/454541/articles/552139-excavated-farmland-with-plastic-mulching-as-a-strategy-in-saving-water-and-controlling-soil-salinization-in-dryland-agricultural-areas



1
nir
lii
pro
e,
5
g
0a1
Ξ.
red
iew
ev.
1
90
d
0ee
ф.
no
as
q
nud
÷
eb
Id
3
hić
H
7
6
08
147
80
20
731
16
64
u.1
_a
4
22
0.0
5
016
01.
S:
£.
Ę.
d.
Sio
- 00
-B.
ermi
permi
out permi
thout permi
without permi
se without permi
euse without permi
o reuse without permi
No reuse without permi
d. No reuse without permi
rved. No reuse without permi
served. No reuse without permi
s reserved. No reuse without permi
hts reserved. No reuse without permi
ights reserved. No reuse without permi
Il rights reserved. No reuse without permi
All rights reserved. No reuse without permi
er. All rights reserved. No reuse without permi
nder. All rights reserved. No reuse without permi
funder. All rights reserved. No reuse without permi
or/funder. All rights reserved. No reuse without permi
thor/funder. All rights reserved. No reuse without permi
author/funder. All rights reserved. No reuse without permi
he author/funder. All rights reserved. No reuse without permi
s the author/funder. All rights reserved. No reuse without permi
r is the author/funder. All rights reserved. No reuse without permi
lder is the author/funder. All rights reserved. No reuse without permi
holder is the author/funder. All rights reserved. No reuse without permi
it holder is the author/funder. All rights reserved. No reuse without permi
ight holder is the author/funder. All rights reserved. No reuse without permi
by right holder is the author/funder. All rights reserved. No reuse without permi
copyright holder is the author/funder. All rights reserved. No reuse without permi
a copyright holder is the author/funder. All rights reserved. No reuse without permi
The copyright holder is the author/funder. All rights reserved. No reuse without permi
<ul> <li>The copyright holder is the author/funder. All rights reserved. No reuse without permi</li> </ul>
2 - The copyright holder is the author/funder. All rights reserved. No reuse without permi
0022 - The copyright holder is the author/funder. All rights reserved. No reuse without permi
n 2022 — The copyright holder is the author/funder. All rights reserved. No reuse without permi
Jan $2022 - $ The copyright holder is the author/funder. All rights reserved. No reuse without permi
$8~{\rm Jan}~2022 - {\rm The}$ copyright holder is the author/funder. All rights reserved. No reuse without permi
ea 8 Jan 2022 — The copyright holder is the author/funder. All rights reserved. No reuse without permi
norea 8 Jan 2022 — The copyright holder is the author/funder. All rights reserved. No reuse without permi
uthorea 8 Jan 2022 — The copyright holder is the author/funder. All rights reserved. No reuse without permi
Authorea 8 Jan $2022 - $ The copyright holder is the author/funder. All rights reserved. No reuse without permission
on Authorea 8 Jan 2022 — The copyright holder is the author/funder. All rights reserved. No reuse without permi
xd on Authorea 8 Jan 2022 — The copyright holder is the author/funder. All rights reserved. No reuse without permi









