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*Supplementary Information*

# Drought Adaptation in the Ningxia Hui Autonomous Region, China: Actions, Planning, Pathways and Barriers. *Sustainability* 2015, *7*, 15029-15056

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**Questionnaire**

Form No. _____ Date:__/___/____

**1. General Information**

(1) Nationality: A. Han B. Hui C. Others
(2) Gender: A. Male B. Female
(3) Age:_____
(4) Family population:_____people
(5) Education level: A. Below primary school B. Primary school C. Middle school D. High school/Technical secondary school E. College and above
(6) Primary occupation: A. Plantation B. Livestock C. Part-time job D. Self-employed E. Civil servant F. Enterprise and public institution G. Others (specify):
(7) Total gross income of whole family ¥_____ yuan, of which income of agriculture and livestock ¥_____yuan
(8) What is the main source of your family income? (Multiple choices) A. Plantation B. Livestock C. Part-time job D. Business E. Salary F. Others (specify)_____

**2. Variation in Local Drought and Its Impact**

(9) Do you know droughts if have become more or less severe, compared to those before?
A. Very more B. More C. No change D. Less E. Very less

(10) What is the negative impact of drought on agriculture and livestock production?
A. Very great B. Great C. No impact D. Small E. Very small

**3. Adaptation Measure and Evaluation of Effects**

(11) According to your understanding, what measures have been taken to cope with drought in your region? (Multiple choice)
A. Adjustment of cropping structure B. Promotion of drought-resistant varieties
C. Development of efficient water-saving agriculture (drop irrigation, spray irrigation)
D. Development of facility agriculture E. Promotion of film-mulching technologies
F. Agriculture insurance G. Rainwater harvesting project
H. Construction and upgrade of reservoirs and canals
I. Sand-gravel plastic mulching for selenium sand melon
J. Shifting grazing to barn feeding in captivity K. Artificial precipitation
L. Land transfer M. Migration relocation
N. Establishment of early warning system for drought disaster
O. Publicity propaganda

(12) Based on your understanding, please evaluate the effects of drought measures you chose in Question (11):

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| Adjustment of cropping structure | **1. How about the effect of the measure "Adjustment of cropping structure" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| Adjustment of cropping structure | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied??**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Promotion of drought-resistant varieties | **1. How about the effect of the measure "Promotion of drought-resistant varieties" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied??**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Development of efficient water-saving agriculture | **1. How about the effect of the measure "Development of efficient water-saving agriculture" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied??**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Development of facility agriculture | **1. How about the effect of the measure "Development of facility agriculture" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |

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| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
| Promotion of film-mulching techniques | **1. How about the effect of the measure "Promotion of film-mulching techniques" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
| Agriculture insurance | **1. How about the effect of the measure "Agriculture insurance" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have social effects?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |

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| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
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| Rainwater harvesting project | **1. How about the effect of the measure "Rainwater harvesting project" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on the surrounding environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
| | |
| Construction and upgrade of reservoirs and canals | **1. How about the effect of the measure "Construction and renovation of reservoirs and canals" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on the surrounding environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
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| sand gravel plastic mulching | **1. How about the effect of the measure "sand gravel plastic mulching for selenium sand melon" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |

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| for selenium sand melon | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on local soil or climate?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
| Shifting grazing to barn feeding in captivity | **1. How about the effect of the measure "Shifting grazing to barn feeding in captivity" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |
| Artificial precipitation | **1. How about the effect of the measure "Artificial precipitation" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |

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| | **4. Does this measure have impacts on ecological environment?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Land transfer | **1. How about the effect of the measure "Land transfer (Water-saving)" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have social effects?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Migration relocation | **1. Under the persistent drought, how about the effect of the measure "Migration relocation" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have social effects?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Establishment of early warning system for drought disaster | **1. How about the effect of the measure "Establishment of early warning system for drought disaster" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have social effects?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |

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| Publicity propaganda | **1. How about the effect of the measure "Publicity propaganda (knowledge and technology of preventing and resisting drought)" in coping with current drought?**<br>A. Very good B. Good C. Average D. Bad E. Very bad |
| | **2. Can this measure be used to cope with future drought?**<br>A. It can be used in the next 5 years B. It can be used in the next 10 years<br>C. It can still work after the next 10 years<br>D. It cannot be used for future drought E. Don't know |
| | **3. Can this measure be feasibly implemented?**<br>A. Very feasible B. Feasible C. Averagely feasible D. Infeasible<br>E. Very infeasible |
| | **4. Does this measure have social effects?**<br>**(① Positive_____ ② Negative_____)**<br>A. Very great B. Great C. No impact D. Small E. Very small |
| | **5. If droughts continue, what is the possibility of this measure being given priority to be applied?**<br>A. Very great B. Great C. Average D. Small E. Very small |

(13) What measures do you think should also be implemented to cope with drought, except for the measures above-mentioned?