

Supporting Information

Leveraging a sanitation value chain framework could address implementation challenges and reinvent China's Toilet Revolution in rural areas

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Table S1. Strength of association (χ^2 value) between willingness of responding households to participate in the Toilet Revolution's call for renovating rural toilets and possible explanatory variables (gender, age, education, occupation, annual net income and resident population). Values in italics indicate statistically significant association at 95% confidence interval

Province	Gender	Age	Education	Occupation	Annual net household income	Household resident population
Jiangsu	0.462	<i>26.000</i>	<i>26.000</i>	<i>7.973</i>	0.248	5.720
Sichuan	1.095	10.377	8.154	8.821	9.196	9.666
Qinghai	0.644	<i>44.000</i>	1.346	0.585	0.853	3.479
Gansu	7.175	27.983	29.281	12.096	21.617	24.994
Henan	4.861	9.279	13.572	6.893	7.002	20.396
Inner Mongolia	1.604	<i>16.222</i>	5.596	2.213	3.211	7.692
Guangxi	2.078	17.845	10.171	6.909	20.899	20.627
Shandong	1.255	1.255	4.306	2.526	1.879	5.373
Jiangxi	5.931	19.865	13.729	7.195	11.547	26.563
Jilin	0.777	11.454	6.057	9.779	<i>27.953</i>	20.503

Table S2. Strength of association (χ^2 value) between household satisfaction with their current toilet and possible explanatory variables (gender, age, education, occupation, annual net income, and resident population). Values in italics indicate statistically significant association at 95% confidence interval

Province	Gender	Age	Education	Occupation	Annual net household income	Household resident population
Jiangsu	0.963	<i>33.944</i>	<i>31.688</i>	8.092	0.516	13.632
Sichuan	3.057	15.938	23.652	7.883	19.573	26.374
Qinghai	1.392	12.797	4.712	7.760	11.321	22.664
Gansu	2.820	24.581	11.611	9.352	6.410	21.662
Henan	3.292	14.935	15.869	3.005	7.702	28.526
Inner Mongolia	3.138	<i>30.917</i>	<i>9.825938</i>	4.206	13.774	8.797
Guangxi	2.242	18.404	5.401	7.764	15.433	23.166
Shandong	1.524	4.571	<i>13.016</i>	2.249	5.234	7.246
Jiangxi	2.394	10.905	10.680	4.940	11.501	17.977
Jilin	2.215	16.429	<i>13.376</i>	10.253	<i>26.732</i>	17.822

Questionnaire used in survey (English Translation)

Part A. Personal information

1. What province do you live in?

2. What is your gender?

- ☐ Male
- ☐ Female

3. How old are you?

- ☐ ≤20 years
- ☐ 21-30 years
- ☐ 31-40 years
- ☐ 41-50 years
- ☐ 51-60 years
- ☐ 61-70 years
- ☐ ≥70 years

4. What is your level of education?

- ☐ Primary school
- ☐ Junior high school
- ☐ Senior high school
- ☐ Junior college
- ☐ University and above
- ☐ None

5. What is your occupation?

- ☐ I'm a farmer
- ☐ I'm engaged in a business
- ☐ Other _____
- ☐ None

6. What is your net annual household income?

- ☐ Less than 10000 CNY
- ☐ 10000-20000 CNY
- ☐ 20000-40000 CNY
- ☐ 40000-60000 CNY
- ☐ More than 60000 CNY
- ☐ Don't know

7. What is the resident population of your family?

- ☐ 1 person
- ☐ 2 persons
- ☐ 3 persons
- ☐ 4 persons

- ☐ 5 persons
- ☐ 6 persons
- ☐ 7 persons
- ☐ More than 8 persons

Part B. Basic information

8. Has your household toilet been renovated?

- ☐ Yes
- ☐ No

9. When did you renovate your toilet? (Do not record response if no renovations were done)

- ☐ Less than 1 year
- ☐ 1-2 years
- ☐ 3-4 years
- ☐ 5-10 years
- ☐ More than 10 years

10. How much was the material cost of toilet renovation? (Do not record response if no renovations were done)

- ☐ Funds for materials provided by the government
- ☐ Self-financing_____
- ☐ Don't know

11. What type of renovated toilet was built in your home?

Water flush toilets:

- ☐ Three-chamber septic tank toilet
- ☐ Double-vault funnel toilet
- ☐ Biogas-linked toilet
- ☐ Integrated flushing toilet

Latrines:

- ☐ Feces and urine diversity toilet
- ☐ Mixed-dry toilet

Other_____

12. Do flies and mosquitoes gather near the toilet during summer months?

- ☐ No
- ☐ Rarely
- ☐ Occasionally
- ☐ Frequently

13. What does your toilet smell like?

- ☐ Unsatisfactory - strong, unpleasant odor present
- ☐ Acceptable - noticeable odor, but not objectionable
- ☐ Satisfactory - minimal to no odor, meets expectations.

14. How convenient is it for you to clean your toilet/pit?

- ☐Excellent
- ☐Good
- ☐Average
- ☐Below average
- ☐Poor
- ☐Unknown

15. How often do you need to perform toilet maintenance?

- ☐Never
- ☐Rarely
- ☐Occasionally
- ☐Frequently

16. How does toilet renovation operate in your area?

- ☐Through a third party
- ☐Government-driven, multi-departmental collaboration
- ☐Other _____
- ☐None
- ☐Don't know

17. What is the toilet management model in your area?

- ☐Keep records of new (modified) toilets
- ☐Staff investigate and maintain toilets and do a good job of daily maintenance
- ☐Other _____
- ☐None
- ☐Don't know

18. In order to realize the mode of "building toilets by business, managing toilets by business, and raising toilets by business", what are the specific ways of managing toilets in your area?

- ☐Provided to the operator
- ☐Large and medium-sized enterprise title sponsorship
- ☐Other _____
- ☐None
- ☐Don't know

19. What is the promotion model of the toilet renovation project in your area?

- ☐Local government led the pilot, individuals signed up to participate
- ☐Contracted to a third party, households applied voluntarily, third-party organizations built/improved the toilets
- ☐Cooperative model in which the government issued policies, third parties provided technical support, and households participated voluntarily
- ☐Other _____
- ☐None
- ☐Don't know

20. Does the current toilet meet your expectations?

- ☐ Particularly satisfied
- ☐ Relatively satisfied
- ☐ General satisfaction
- ☐ Dissatisfied

Part C. Willingness (expectation)

21. What was your motivation for renovating your toilet? (Do not record response if no renovations were done)

- ☐ Wanted to improve the living conditions of the family
- ☐ Government policies and subsidies
- ☐ Other _____

22. How satisfied are you with the renovated toilet on a scale of 0-100? (Do not record response if no renovations were done)

- ☐ 0-20 points
- ☐ 21-40 points
- ☐ 41-60 points
- ☐ 61-80 points
- ☐ 81-100 points

23. Did the local toilet renovation work improve the quality of your family's living environment? (Do not record response if no renovations were done)

- ☐ Significantly improved
- ☐ Slightly improved
- ☐ No noticeable change
- ☐ Adversely affected

24. What problems or difficulties did/do you face in construction, installation, use, and maintenance of your toilet?

25. What are your suggestions for improving the existing problems with rural toilets?

26. Are you aware of the country's Toilet Revolution program?

- ☐ Comprehensive understanding
- ☐ Moderate understanding
- ☐ Basic understanding
- ☐ Aware but unfamiliar
- ☐ Unaware

27. Have you received any publicity and training related to the Toilet Revolution?

- ☐ Yes
- ☐ None

28. Regarding the call of the country, are you willing to participate in the Toilet Revolution?

- ☐ Highly willing
- ☐ Somewhat willing
- ☐ Neutral / Undecided
- ☐ Somewhat unwilling
- ☐ Highly unwilling

29. For the toilet types mentioned in question 11, in addition to government subsidies, are you willing to increase the investment in toilet renovation to improve comfort, and if so, how much are you willing to pay for the renovation?

- ☐ Unwilling
- ☐ Less than 500 CNY
- ☐ 500-1000 CNY
- ☐ 1000-2000 CNY
- ☐ More than 2000 CNY

30. How do you think new ecological toilets will be implemented?

- ☐ Rely on government policy, financial support
- ☐ Rely on government's policy support and promotion, households purchase independently
- ☐ Rely on construction demonstration, letting everyone know
- ☐ Other _____

31. Who do you think should provide the new toilet technology?

- ☐ Government
- ☐ Enterprise market
- ☐ Don't know

Questionnaire used in survey (in Mandarin)

【A. 个人信息】

1. 您所在的省份？

2. 您的性别？

☐男

☐女

3. 您的年龄？

☐≤20

☐21-30

☐31-40

☐41-50

☐51-60

☐61-70

☐≥70

4. 您的受教育程度？

☐小学

☐初中

☐高中

☐专科

☐大学及以上

☐无

5. 您的职业？

☐务农

☐务工

☐其他_____

☐无

6. 您的家庭年净收入？

☐10000 元以下

☐10000-20000 元

☐20000-40000 元

☐40000-60000 元

☐60000 元以上

☐不清楚

7. 您的家庭常住人口？

☐1 人

☐2 人

☐3 人

☐4 人

- ☐5 人
- ☐6 人
- ☐7 人
- ☐More than 8 人

【B. 基本情况】

8. 是否改建过厕所？

- ☐是
- ☐否

9. 改建厕所的时间？（没有改厕可不填）

- ☐不到 1 年
- ☐1-2 年
- ☐3-4 年
- ☐5-10 年
- ☐10 年以上

10. 改厕投入的物资经费？（没有改厕可不填）

- ☐全部由政府承担
- ☐自费_____
- ☐不清楚

11. 您家的厕所改建采用的类型？

水冲厕所：

- ☐三格化粪池式厕所
- ☐双瓮漏斗式厕所
- ☐三联沼气池式厕所
- ☐完整下水道水冲式厕所

旱厕：

- ☐粪尿分集式厕所
- ☐粪尿混合式厕所

其他_____

12. 夏天是否有苍蝇和蚊子？

- ☐无
- ☐很少
- ☐偶尔
- ☐频繁

13. 平时使用时厕所的异味情况？

- ☐不满意——有强烈、难闻的气味
- ☐可接受——气味明显，但不令人反感
- ☐令人满意——几乎没有气味，符合预期

14. 前端便器/便坑清洁的便利程度？

- ☐优秀
- ☐好

- ☐平均水平
- ☐低于平均水平
- ☐差
- ☐不清楚

15. 厕所的维护频率？

- ☐从来没有
- ☐很少
- ☐偶尔
- ☐频繁

16. 您所在地区的厕所运营模式？

- ☐引入第三方
- ☐政府主导，多部门合作
- ☐其他_____
- ☐无
- ☐不清楚

17. 您所在地区的厕所管理模式？

- ☐对新(改)建的户厕建档造册
- ☐工作人员会对厕所进行排查和维护，做好日常养护
- ☐其他_____
- ☐无
- ☐不清楚

18. 您所在地区的厕所为了实现“以商建厕、以商管厕、以商养厕”的模式，采用的方式具体有哪些？

- ☐承包给运营商
- ☐大中型企业冠名赞助
- ☐其他_____
- ☐无
- ☐不清楚

19. 您所在地区的改厕项目的推广模式？

- ☐当地政府主导开展试点，个人报名参加
- ☐承包给第三方，农户自愿申请并由第三方组织代建改厕
- ☐政府出台政策、第三方提供技术支撑、农户自愿参与的合作模式
- ☐其他_____
- ☐无
- ☐不清楚

20. 现在的厕所是否满足你的期望？

- ☐非常满意
- ☐比较满意
- ☐一般
- ☐不满意

【C. 意愿（期望）】

21. 您家厕所改建的动机是？（没有改厕可不填）
- ☐想改善家庭生活条件
 - ☐政府政策，还有补贴
 - ☐其他_____
22. 您对改建后厕所的满意度评分？（没有改厕可不填）
- ☐0-20 分
 - ☐21-40 分
 - ☐41-60 分
 - ☐61-80 分
 - ☐81-100 分
23. 本地的改厕工程对您家人的居住环境质量是否具有改善作用？（没有改厕可不填）
- ☐显著改善
 - ☐略有改善
 - ☐无明显变化
 - ☐不利影响
24. 您家的厕所在建设、安装、使用以及维护等方面存在哪些问题或困难？
- _____
25. 您对农村厕所的现存问题有什么改进建议？
- _____
26. 您对于国家开展的“厕所革命”的了解程度如何？
- ☐全面了解
 - ☐中等了解
 - ☐基本了解
 - ☐听说过但不熟悉
 - ☐不知道
27. 您是否接受过厕所革命相关的宣传和培训？
- ☐是
 - ☐否
28. 根据国家的号召，您是否愿意参与厕所改造？
- ☐非常愿意
 - ☐有些愿意
 - ☐中立/未定
 - ☐有些不愿意
 - ☐非常不愿意
29. 除了政府补贴之外，您是否愿意增加对厕所的改造投入？如是，愿意出多少钱进行改厕？
- ☐不愿意
 - ☐500 元以下
 - ☐500-1000 元

☐1000-2000 元

☐2000 元以上

30. 你认为新型生态环保厕所的推广，如何实施？

☐依靠政府政策，资金支持

☐依靠政府政策支持、推广，居民自主购买

☐建设示范，让大家都知道

☐其他_____

31. 你认为谁可以提供新型生态环保厕所技术？

☐政府

☐企业市场

☐不清楚