



**FACTORS INFLUENCING THE SUCCESS OF COUNTY WATER PROJECTS A CASE OF KIAMBU COUNTY**

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**ABSTRACT**

*Success of county water projects comprises all organized activities and planning regarding water resources development, conservation, protection and control from water adverse effects. Success of county water projects includes aspects such as water uses (inherent values, domestic needs, food security, energy supply, transportation and recreation), conservation, assessment, protection, participation and governance. This implies that management of water resources consists in matching water supply and water demand, and reducing environmental damage caused by water, or to waters and the bodies of water. The general objective of the study is to establish factors influencing the success of county water projects a case of Kiambu County. Specific variables were; project water quality and project stakeholder participation on success of county water projects a case of Kiambu County. The study adopted descriptive research design which determined and reported the way things were. Stratification was used to divide the population into different strata i.e. Project Managers, Project Engineers and Project Architectures so as to draw randomly a predetermined number of units. The study used respondents working in the 9 water companies in Kiambu County. The collected data was coded into the Statistical Program for Social Sciences (SPSS) version 20 because of its ability to analyze data easily and accurately. This result indicated that the two independent variables notably; project water quality and project stakeholder participation were significant in contributing to success of county water projects. The coefficient of determination indicated that 94.9% of the variation on success of county water projects was influenced by independent variables project water quality and project stakeholder participation. This implies that there existed a strong positive relationship between independent variables and success of county water projects.*

**Key Words:** Project Water Quality, Stakeholder Participation, Kiambu County

## INTRODUCTION

Success of county water projects comprises all organized activities and planning regarding water resources development, conservation, protection and control from water adverse effects. Success of county water projects includes aspects such as water uses (inherent values, domestic needs, food security, energy supply, transportation and recreation), conservation, assessment, protection, participation and governance. This implies that management of water resources consists in matching water supply and water demand, and reducing environmental damage caused by water, or to waters and the bodies of water. According to Hirjiet al. (2012), success of county water projects deals with a number of issues which include: irrigation management; the process of water resources law, policy and strategy formulation; ground success of county water projects; catchment protection; management of wetlands; flood management; and rural and urban water supply management. Success of county water projects uses hydraulic and other structures, complex water resources systems and measures to influence water demand use, conservation and protection.

As noted by Djordjevic (2009) the complex intricacy of success of county water projects depends on both, the water demand and the water supply. Therefore, success of county water projects is a dynamic process of devising alternative sequences or activities that will optimize the achievement of the objectives related to water resources. As noted by Iouliat al. (2008), in our days' water has become one of the most important raw materials, energy carrier and environmental factors in the society, the limited availability of which may considerably hinder the socio-economic development of many regions. The carefully planned management of

water resources is therefore, an indispensable requirement.

### Statement of the Problem

According to WRMA (2012), water scarcity in Kiambu County has been accelerated by increasing demand in the domestic and agricultural sectors. This is associated with rapid population growth and unregulated use of water, especially in the rural areas, which has caused over-exploitation and degradation of water resources. Catchment degradation and extraction of riverine resources such as sand, ballast, building stones and vegetation has led to drying of rivers and shallow boreholes in the Sub-county. Despite this huge investment in water projects, there has been continued outcry by the public on the inability of the projects to meet their intended objectives while many water projects have taken so long to be completed and many more have been abandoned before completion (Onjala, 2012).

According to the World Health Organization (2011) 2.2 million people in developing countries, most of them children, die every year from diseases associated with lack of safe drinking water and inadequate sanitation and hygiene. Improvements in these services could reduce mortality rates due to diarrheal diseases by an estimated 65% and related morbidity by 26% (WHO, 2011). Chikati (2009) explains that over the past ten years, both in developed and developing countries; analysis has shown that the failure rate for projects achieving their stated objectives is extremely high, at 60% in some cases. Some of these projects have gone to full implementation but without much benefit to the communities. The UN Joint Monitoring Program estimates the failure rate for most water development projects in Africa at anywhere from 30 to 60%. Despite the failed water development projects governments and international financial institutions continue investing hundreds of millions of dollars to keep the projects going (WB, 2010)

despite evidence that they have not succeeded. In Kenya about 35% of the water projects implemented will fail due to poor management of the initiation, planning, execution and closure phases of such projects thus don't meet the desired goals and objectives (UNICEF, 2008).

Despite the government and non- governmental organizations making good efforts to come up with water projects in order to supply water to citizens, this projects they have not been able to cover all areas especially rural areas. Consequently, it has become necessary for communities to organize themselves and launch community water projects to ensure they bring water closer to their homes (UNICEF, 2014). Many community water projects are started, but fail to realize the intended objectives with a good number of these water projects collapsing before completion. A number water projects established run for one or two years after completion and then collapse; therefore, they fail to meet the intended objectives. This study seeks to establish factors influencing the success of county water projects a case of Kiambu County.

### **Objectives of the study**

The general objective of the study was to establish factors influencing the success of county water projects a case of Kiambu County. The **specific objectives were:**

- To evaluate the influence of project water quality on success of county water projects a case of Kiambu County.
- To determine the influence of project stakeholder participation on success of county water projects a case of Kiambu County.

## **LITERATURE REVIEW**

### **Theoretical Framework**

#### **Systems Theory**

According Hartman, (2010) everything is fundamentally interrelated and input into one aspect of a complex system will affect other aspects of that system which will in turn affect other aspects of the system and so on and so forth. In addition, complex living systems are composed of smaller systems and are in turn imbedded within larger systems – the idea of nested hierarchy or holonarchy. The ripple effect inherent in system responses also impacts the systems of which the original system is an integral part. Systems are thus circuits of information flow. The circuitry of a system involves the reception of input from the environment, the perception of that input in reference to existing codes, and finally, the system's response (Houghteling, 2009).

An organization cannot be understood without considering the information-generating environment in which it operates. Instead of being fundamentally discreet entities, an organization and its environment co-create their relationship (as noted above, systems operate within systems within systems). Just as systems theory recognizes that an organization is not fundamentally separate from its environment, systems theory does not allow the employee to be seen as fundamentally separate from the organization – or from one another. A workforce is by definition composite. When seen systemically, a workforce can be clearly seen as a network (Houghteling, 2009).

According to Wheatley (2009), organizational systems are “process structures” that can reorganize themselves or evolve to a new order, depending on circumstances. The potent force that shapes behavior in these organizations and in all natural systems is the combination of simply expressed expectations of purpose, intent, and values, and the freedom for responsible individuals to make sense of these in their own way.

#### **Stakeholder Theory**

According to Watt, (2013) stakeholder theory is a theory of organizational management and business ethics that addresses morals and values in managing an Organization. It identifies and models the groups which are stakeholders of a project, and both describes and recommends methods by which management can give due regard to the interests of those groups. In short, it attempts to address the "Principle of Who or What Really Counts (Freeman, 2014). The stakeholder view of strategy is an instrumental theory of the projects, integrating both the resource-based view as well as the market-based view, and adding a sociopolitical level. This view of the firm is used to define the specific stakeholders of a project of stakeholder identification as well as examine the conditions under which these parties should be treated as stakeholders.

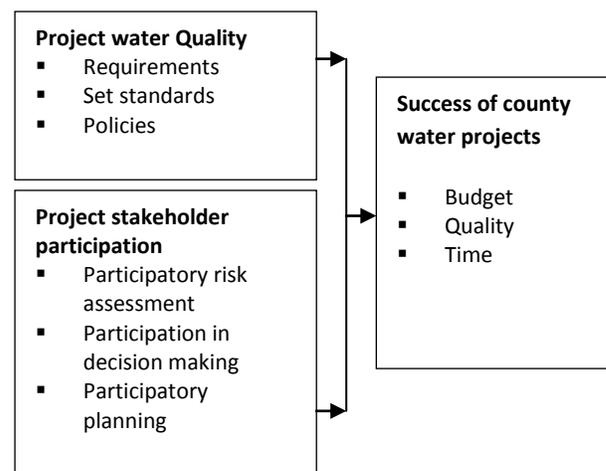
The importance of stakeholders from a strategy development and service planning perspective is well acknowledged (Ackermann and Eden, 2011). Still, the role of stakeholders and performance measurement has been little discussed. The issue of who is seen as the end user of the performance measurement information generated has received little attention and yet, particularly in the public sector especially in water projects, is of critical importance.

Applying a stakeholder conception of projects as opposed to the more traditional input-output perspective implies adhering to a belief where all actors are involved with water projects in order to obtain benefits. This differs from the input-output model that illustrates how certain factors contribute input which the black box of an organization converts to benefits for its customers (Donaldson and Preston, 2011).

Stakeholder theory is primarily a management instrument. The attributes power, urgency and

legitimacy of claims define projects stakeholders. Power and urgency must be attended to if Managers are to serve the legal and moral interests of legitimate stakeholders. Stakeholder theory thus contains methods for identifying and managing stakeholders. In addition, a substantial amount of work has been done on identifying the relative influence of different stakeholders (Yee-Chin, 2014).

### Conceptual Framework



**Independent variables      Dependent variable**  
**Figure 1: Conceptual Framework**

#### Project water quality

The term project water quality means separation of solids and stabilization of pollutants. In turn stabilization means the degradation of organic matter until the point at which chemical or biological reactions stop. Project water quality can also mean the removal of toxic or otherwise dangerous substances (heavy metals or phosphorous) which are likely to distort sustainable biological cycles, even after stabilization of the organic matter." (Sasse, 2008).

#### Project stakeholder participation

A project stakeholder is a person or group of people who have a vested interest in the success of a project and the environment within which the project operates (McElroy & Mills, 2008). The implication is that a stakeholder is any individual or group with the power to be a threat or a benefit (Gibson, 2009). The demands of the community exert pressure on organizations to develop new methods of working and communicating with stakeholders (Watson, Osborne-Brown, & Longhurst, 2012).

## **Empirical Review**

### **Project water quality**

Water is the key ingredient for survival of all life forms on this planet. Hence, quite naturally human settlements old or new chose to settle close to a source of fresh water. It is important to recognize the fact that unsafe drinking water, along with poor sanitation and hygiene, are the main contributors to an estimated 4 billion cases of diarrheal disease annually, causing 1.5 million deaths, most among children under the age of 5 years (JMP, 2008). Microbiological contamination of water causes many waterborne diseases like typhoid, or hepatitis, in other cases contaminated water may also be the source of water-based diseases such as the guinea worm. To address this, the Millennium Development Goals set by the United Nations seek to halve the proportion of people without adequate water and sanitation facilities by the year 2015 (MDG, 2013).

Drinking water must be microbe logically safe, free from toxic or harmful chemicals or substances, and comparatively free of physical compounds that affect the aesthetics of water, including turbidity, color, and taste-producing substances. While most efficient water quality plants are able to achieve and provide these standards to their users, it is hard to meet such standards in cases where the piped

supply is unavailable or where the piped network is contaminated. Household Water Quality and Safe Storage (HWTS) systems were developed to provide a first or extra barrier of protection to ensure safe drinking water quality. They have gained increasing recognition as well as been implemented in the developing world for as many as 15 years. The idea is simple- to treat water at the point of use, preferably using effective but low-cost quality technologies that could be developed using locally available raw materials. Ever since, HWTS technologies such as flocculation, filtration, chlorination and solar disinfection (SODIS) have been instrumental in treating water at the point of use (Sobsey, 2012). There is significant evidence to suggest that these systems have been successful in improving the drinking water quality and preventing diarrheal disease (Fewtrell, 2013) but there also has been conflicting evidence from double-blinded studies that question HWTS efficacy (Schmidt, 2008).

### **Project stakeholder participation**

According to WRM rules (Republic of Kenya, 2008), a stakeholder is a person or entity which has influence over or is affected by a certain activity on a resource. Tilbury and Wortman (2014) defined participation as „ to take part, to share and act together“. World Bank (2010) gave a more comprehensive definition of the concept of participation as a process through which stakeholders influence and share control over development initiatives, decisions, and resources that affect them. The World Bank (2008) further noted that when user groups, private sector, advocacy groups, and governments have clear roles, responsibly, and expectations in water resources management, the outcome is likely to be positive. The decisions by governments, developers and other water resource managers require the input of the primary stakeholders, such as the communities

who are either affected by or benefit from success of county water projects activities. The importance of participation in integrating decision-making; in involving different sectors and stakeholders to build capacity and ownership of solutions; in recognizing the role of indigenous communities and empowering the poor and women in the management of natural resources (Brenda & Cesar, 2011).

Participatory approach is an important aspect of success of county water projects, which, as explained by Biswas et al. (2013) is a comprehensive, participatory planning and implementation tool for managing and developing water resources in a way that balances social and economic needs, and ensures protection of ecosystems for future generations. As noted by Tshmanga (2010), a paradigm shift has emerged in success of county water projects forums during the last two decades as a result of which, the social, cultural, economic and political dimensions surrounding water have been found to be pivotal for sustainable management of water resources. More attention is being given to communities and societies as well as acknowledging stakeholder participation in success of county water projects as essential for sustainable development.

Tilbury and Wortman (2014) noted that participation should take forms that increasingly involve stakeholders, based on consultation and consensus building to decision making, risk assessment and partnerships. Hirjiet al (2012) identified three main benefits that can be derived from community participation in success of county water projects. First, governments, developers and other water resources managers find it easy to make decisions when they involve the input of the primary stakeholders, such as the stakeholder participation who are either to be affected by or will be the beneficiaries of success of county water

projects activities. Second, the stakeholder participation is usually aware of the nature of water resources endowment in their respective areas. This makes them appreciate the difficult choices which have to be made in order to manage the limited resources effectively, use them equitably and in a sustainable manner. Third, because of their deep understanding of the local conditions, are always stakeholder participation found to be in a better position to appreciate the possible options. Consequently, stakeholder participation has been capable, in many cases, of making and putting in place, well-informed success of county water projects policies and strategies, which are accepted, supported and implemented by the communities themselves. And in that process, water resources come to be managed sustainably and water-use conflicts are minimized.

## RESEARCH METHODOLOGY

The study adopted descriptive research design which determines and reports the way things are (Mugenda and Mugenda, 2008). The population of this study was the nine (9) Water Companies licensed by the Ministry of Water and Irrigation in Kiambu county namely: Limuru Water and Sewerage Company, Kikuyu Water and Sewerage Company, Kiambu Water and Sewerage Company, Karuri Water and Sewerage Company, Githunguri Water and Sewerage Company, Ruiru- Juja Water and Sewerage Company Limited, Gatundu South Water and Sanitation Company, Karimenu Water and Sanitation Company and Thika Water and Sewerage Company Limited. The study targeted the management of the nine (9) Water Service Companies licensed by the Ministry of Water and Irrigation in Kiambu County which will include 18 Project Managers, 36 Project Engineers and 54 Project Architectures.

Data was collected using questionnaires. They included both structured and unstructured questions. The structured questions were used in an effort to conserve time and money as well as to facilitate an easier analysis as they are in immediate usable form; while the unstructured questions were used so as to encourage the respondent to give an in-depth and felt response without feeling held back in revealing of any information. A Likert-scale (1 = strongly agree and 5 = strongly disagree) was used.

The research assistants were trained in data collection which incorporated pre-testing the questionnaires in the selected county water projects. They were in charge of administering the questionnaires for the first time. The rationale of this was to save on time and cost of research. The questionnaires were collected immediately upon completion.

The collected data was coded and analyzed using the Statistical Program for Social Sciences (SPSS) version 20 because of its ability to analyze data easily and accurately.

## **FINDINGS**

The response rate was 72% of the total sample size and the non response was 28%. The response of 72% facilitated towards gathering sufficient data that was generalized to reflect the opinions of respondents on the establish factors influencing the success of county water projects a case of Kiambu County. This was in tandem with Graham (2002) that a response rate above 30 to 50% of the total sample size contributes towards gathering of sufficient data that could be generalized to represent the opinions of respondents in the target population on the sought study problem.

The study found it paramount to determine the respondents' gender in order to ascertain whether there was gender parity in the positions indicated

by the respondents. The findings of the study showed that majority of the respondents were male which represented 57% while 43% were female.

The respondents were required to indicate their age where the study findings indicated that majority (44%) indicated that their age bracket was between 40 and 49 years. Analysis of findings also indicated that 28% of the respondents were between 30 and 39 years of age. The findings further indicated that 9% were above 50 years of age while 9% were between 20 and 29 years of age.

Jenster & Hussey (2001) in their study of determining management Capability in organizations associated age with employee efficiency in service delivery where they indicated that there is a positive correlation between age and employee performance. He argued the older an employee was the higher the performance up to a certain age where performance would start declining. He therefore presented this relationship using a sigmoid curve.

The study found it necessary to find out the respondent's years in service as staff members in the success of county water projects in Kenya so as to find out the relationship between work experience and success of county water projects in Kenya. The findings of the study showed that majority (37%) of the respondents had age between 5 to 9 year's experiences while 35% had between 1 to 4 years. It was also revealed that 15% of the respondents had an experience not `exceeding 1 year finally 13% had an experience of more than 10 years. In a study on the relationship between role of Water Company projects and effective management in Kenya, (Maria, 2011) found that management depends highly on the skills of the human resource handling them. She indicated that the skills can be acquired through experience.

## **Project water quality**

**Table 1: Level of agreement with extent to which project water quality affect the success of county water projects a case of Kiambu County**

	not at all	small extent	moderate extent	great extent	very great extent	Mean	Stdev
The choice of quality processes used depends on the quality and variability of the raw water source and the quality objectives.	0	3.7	22.2	51.9	22.2	3.93	.78
Most waters can be treated solely using conventional unit processes without the need for pre-quality	0		7.4	48.1	44.4	4.37	.63
The raw water is initially screened through a set of coarse screens (100mm spacing) to remove gross solids, such as litter and branches, before being conveyed to the plant	0	3.7	33.3	33.3	29.6	3.89	.89
Many processes of water quality rely on the addition of chemical agents. Mixers are designed to disperse the chemicals rapidly and thoroughly throughout the water	0	7.4	29.6	14.8	48.1	4.04	1.06
Drinking water quality usually can undergo dramatic changes in distribution systems and this has made the distribution systems no longer considered as inert systems supplying drinking water to large area	0	18	29.6	22.7	29.6	3.63	1.11

From the findings respondents agreed that the choice of quality processes used depends on the quality and variability of the raw water source and the quality objectives; that most waters can be treated solely using conventional unit processes without the need for pre-quality; that The raw water is initially screened through a set of coarse screens (100mm spacing) to remove gross solids, such as litter and branches, before being conveyed to the plant; that many processes of water quality rely on the addition of chemical agents. Mixers are designed to disperse the chemicals rapidly and thoroughly throughout the water; and that Drinking water quality usually can undergo dramatic changes in distribution systems and this has made the

distribution systems no longer considered as inert systems supplying drinking water to large area as indicated by a mean of 3.93, 4.37, 3.89, 4.04 and 3.63 respectively.

The respondents were asked whether the project water quality affected success of county water projects. The majority (75%) of the respondents indicated that yes project water quality affect success of county water projects while 25% disagreed that project water quality affects success of county water projects.

#### **Project stakeholder participation**

**Table 2: Extent to which Project stakeholder participation affect success of county water projects in Kenya**

	not at all	small extent	moderate extent	great extent	very great extent	Mean	Stdev
Regional body as stakeholder participate in setting up to advice in management of Water Resources	3.7	7.4	22.2	40.7	25.9	3.78	1.05
Participate in development and management of community assets for bulk water supply	3.7	3.7	29.6	25.9	37.0	3.89	1.09
To participate in planning, regulate, conserve and manage Water Resources	0	18	29.6	22.7	29.6	3.63	1.11
To participate in hearing and determine water disputes	7.4	7.4	29.6	29.6	25.9	3.59	1.19
To formulate policy and provide oversight within the water sector	3.7	18.5	33.3	37.0	7.4	3.26	.98

From the findings on level of agreement with statements regarding the effect of Project stakeholder participation on success of county water projects, respondents agreed that; Regional body as stakeholder participate in setting up to advice in management of Water Resources; that Participate in development and management of community assets for bulk water supply; that to participate in planning, regulate, conserve and manage Water Resources; that to participate in hearing and determine water disputes; and that to formulate policy and provide oversight within the water sector to large extent as indicated by a mean of 3.78, 3.89, 3.63, 3.59 and 3.26 respectively.

The respondents were asked whether the Project stakeholder participation affect success of county water projects. The majority (68%) of the respondents indicated that yes project stakeholder

participation affect success of county water projects while 32% disagreed that project stakeholder participation affects success of county water projects.

#### **Success of county water projects**

The study aimed to establish the key factors that determine success of county water projects. These factors included Conservation, Protection, and Control. Success of county water projects was determined by, Conservation, Protection, and Control.

The study sought to determine the extent to which key factors notably Time, Budget, and Quality influenced the success of county water projects. From the findings, Time had a mean score of 4.523, Budget had a mean score of 4.309 and Quality had a mean score of 4.642. These findings were in line

with those of Hirjiet al. (2012), who found out that success of county water projects deals with a number of issues which include: irrigation management; the process of water resources law, policy and strategy formulation; ground success of county water projects; catchment protection;

management of wetlands; flood management; and rural and urban water supply management. Inferences reveal that Time, Budget, and Quality to a large extent determine success of county water projects.

**Table 3: Success of county water projects Factors Mean, Std. Deviation and Variance Results**

success of county water projects	N	Mean	Std. Deviation	Variance
Time	72	4.523	.7404	.548
Budget	72	4.309	.7152	.512
Quality	72	4.642	.6176	.382
<b>Average</b>	<b>72</b>	<b>4.4920</b>	<b>0.6911</b>	<b>0.480</b>

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Summary of the Findings

The findings of the study revealed that the choice of quality processes used depends on the quality and variability of the raw water source and the quality objectives; that most waters can be treated solely using conventional unit processes without the need for pre-quality; that The raw water is initially screened through a set of coarse screens (100mm spacing) to remove gross solids, such as litter and branches, before being conveyed to the plant; that many processes of water quality rely on the addition of chemical agents. Mixers are designed to disperse the chemicals rapidly and thoroughly throughout the water; and that Drinking water quality usually can undergo dramatic changes in distribution systems and this has made the distribution systems no longer considered as inert systems supplying drinking water to large area as indicated by a mean of 3.93, 4.37, 3.89, 4.04 and 3.63 respectively.

#### Project stakeholder participation

On Project stakeholder participation the study found out regional body as stakeholder participate in setting up to advice in management of Water Resources; that Participate in development and management of community assets for bulk water supply; that to participate in planning, regulate, conserve and manage Water Resources; that to participate in hearing and determine water disputes; and that to formulate policy and provide oversight within the water sector to large extent as indicated by a mean of 3.78, 3.89, 3.63, 3.59 and 3.26 respectively.

#### Conclusion

The study drew conclusion that Water Company projects had a great contribution towards realization of increased success of county water projects in Kenya. The study findings established that there is a significant positive relationship between, project water quality, project stakeholder participation, project team development, project physical infrastructure and success of county water projects in Kenya. The findings also

indicated that project water quality followed by project stakeholder participation, project team development and project physical infrastructure influences success of county water projects.

The study noted that project water quality to be the major contributor towards realization of success of county water projects. most waters can be treated solely using conventional unit processes without the need for pre-quality; that The raw water is initially screened through a set of coarse screens (100mm spacing) to remove gross solids, such as litter and branches, before being conveyed to the plant; that many processes of water quality rely on the addition of chemical agents.

On Project stakeholder participation it was concluded that it influences the success of county water projects to a large extent since the importance of participation it is on integrating decision-making and it involves different sectors and stakeholders to build capacity and ownership of solutions; in recognizing the role of indigenous communities and empowering the poor and women in the management of natural resources.

### **Recommendations**

On project water quality the study recommends that drinking water must be microbe logically safe, free from toxic or harmful chemicals or substances, and comparatively free of physical compounds that

affect the aesthetics of water, including turbidity, color, and taste-producing substances. While most efficient water quality plants should be able to achieve and provide these standards to their users, it is hard to meet such standards in cases where the piped supply is unavailable or where the piped network is contaminated.

On stakeholder's participation the study recommends Participatory approach to be used since it is an important aspect of success of water projects, which, as explained by Biswas (2013) is a comprehensive, participatory planning and implementation tool for managing and developing water resources in a way that balances social and economic needs, and ensures protection of ecosystems for future generations. The study also recommends more attention to be given to communities and societies as well as acknowledging stakeholder participation in success of county water projects as essential for sustainable development.

### **Suggestions for Further Studies**

The study established the establish factors influencing the success of county water projects a case of Kiambu County. The study narrowed its research undertaking into project water quality and project stakeholder participation. Since the study was carried out in nine (9) Water Companies licensed by the Ministry of Water and Irrigation in Kiambu County, it is important to undertake similar study in other counties.

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