

# **Seroprevalence and risk factors of *Coxiella burnetii* (Q fever) infection in humans in Bura irrigation scheme, Tana River County, Kenya**

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# INTRODUCTION

- Coxiellosis (Q fever) is a zoonotic disease caused by the bacterium *Coxiella burnetii* (CB) (Brom *et al.*, 2013)
- Distribution –worldwide except New Zealand
- Host range – Livestock and wildlife species such as cattle, sheep, goats, pigs, rodents, birds, dogs and cats among others (Whitney *et al.*, 2009)



- Infected animals shed the organism in
  - ❖ urine
  - ❖ faeces
  - ❖ milk
  - ❖ placental and birth fluids (Dorko *et al.*, 2008)
- Humans are infected through
  1. inhalation of aerosols from infected animals
  2. exposure to animal products such as unpasteurized dairy products.
  3. exposure to infected animal tissue e.g. placentae (Shelling *et al.*, 2003)



# DISEASE IN MAN

- Acute - mild self-limiting febrile illness
- Chronic - severe disease characterized by
  - ✓ hepatitis
  - ✓ pneumonia
  - ✓ endocarditis and
  - ✓ chronic fatigue (Woldehiwez, 2004; Dorko *et al.*, 2008).



- High risk groups- Livestock keepers, abattoir workers, AHSPs and Lab workers
- Impact – morbidity losses and occasional mortality.
- A study done in W. Kenya-seroprev. 30.9%  
(Knobel *et al.*, 2013)

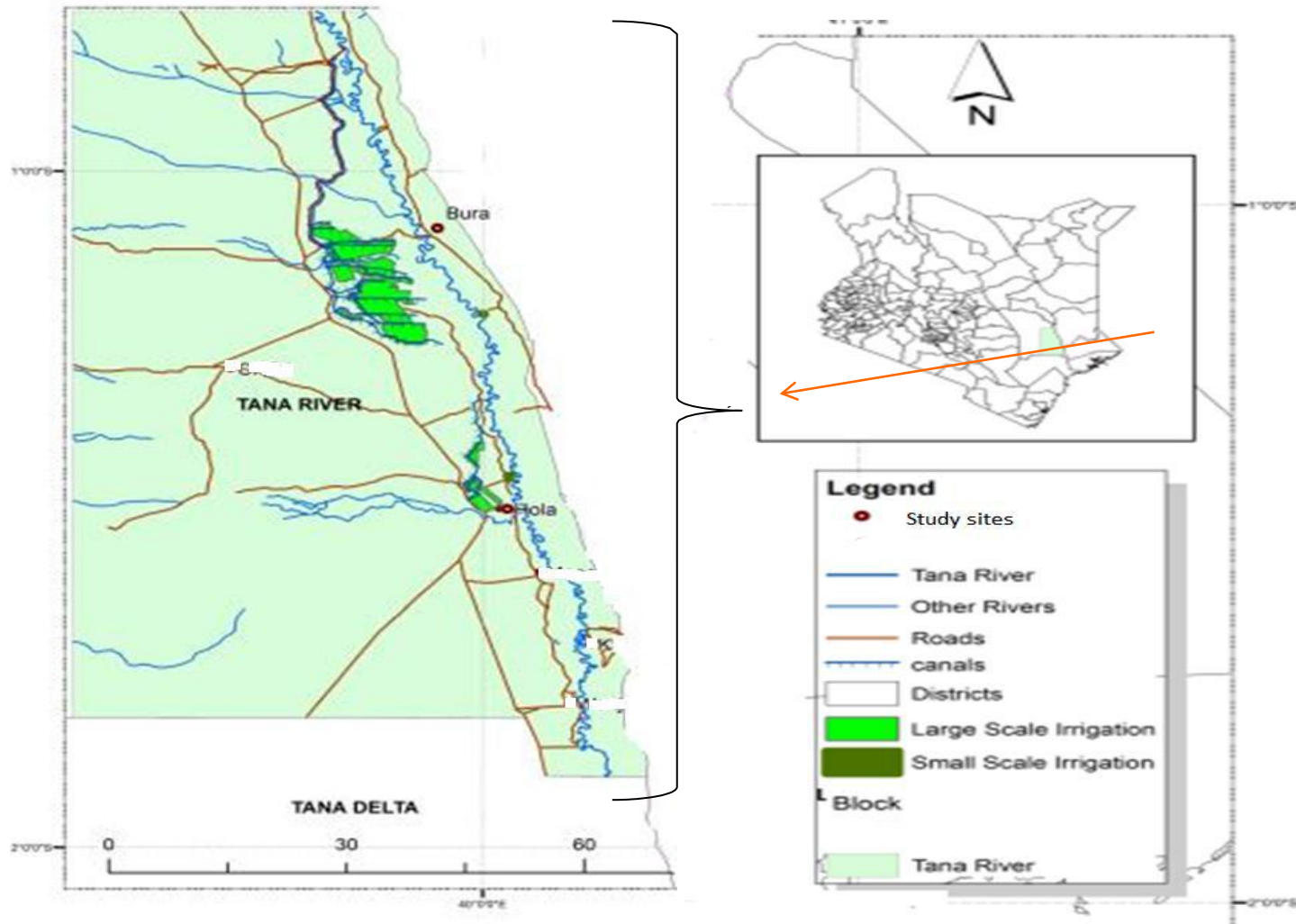


# OBJECTIVES

1. To estimate the prevalence of *Coxiella burnetii* among humans
2. To identify risk factors associated with prevalence among humans



# MATERIALS AND METHODS



Map showing the study site (ILRI GIS Map, 2013)



- Cross sectional survey –Bura irrigation scheme and the *manyattas* outside the scheme
- Households were randomly selected from a list of farmers who own livestock-NIB database
- Data collected through administration of questionnaires
- Consent sought and blood samples collected from selected individuals
- Serum separated and stored at -20 degrees Celsius awaiting transport and analysis in the laboratory
- Serum transported in dry ice





## SAMPLE ANALYSIS

- A commercial ELISA antibody test kit (SERION ELISA classic *Coxiella burnetii* Phase 1 IgG) ([www.virion-serion.de](http://www.virion-serion.de)) was used for the detection of human *Coxiella burnetii* antibodies in serum.
- Reading done at 405nm and 630 nm



# INTERPRETATION

- Positive result > 10% above cut-off
- Suspect result +/- 10% of Cut off
- Negative result > 10% below cut off
- Individual data from the laboratory results and meta-data were entered in Excel (Microsoft corporation, 2010) and analysed in R version 3.1.0 software (R core team, 2014).

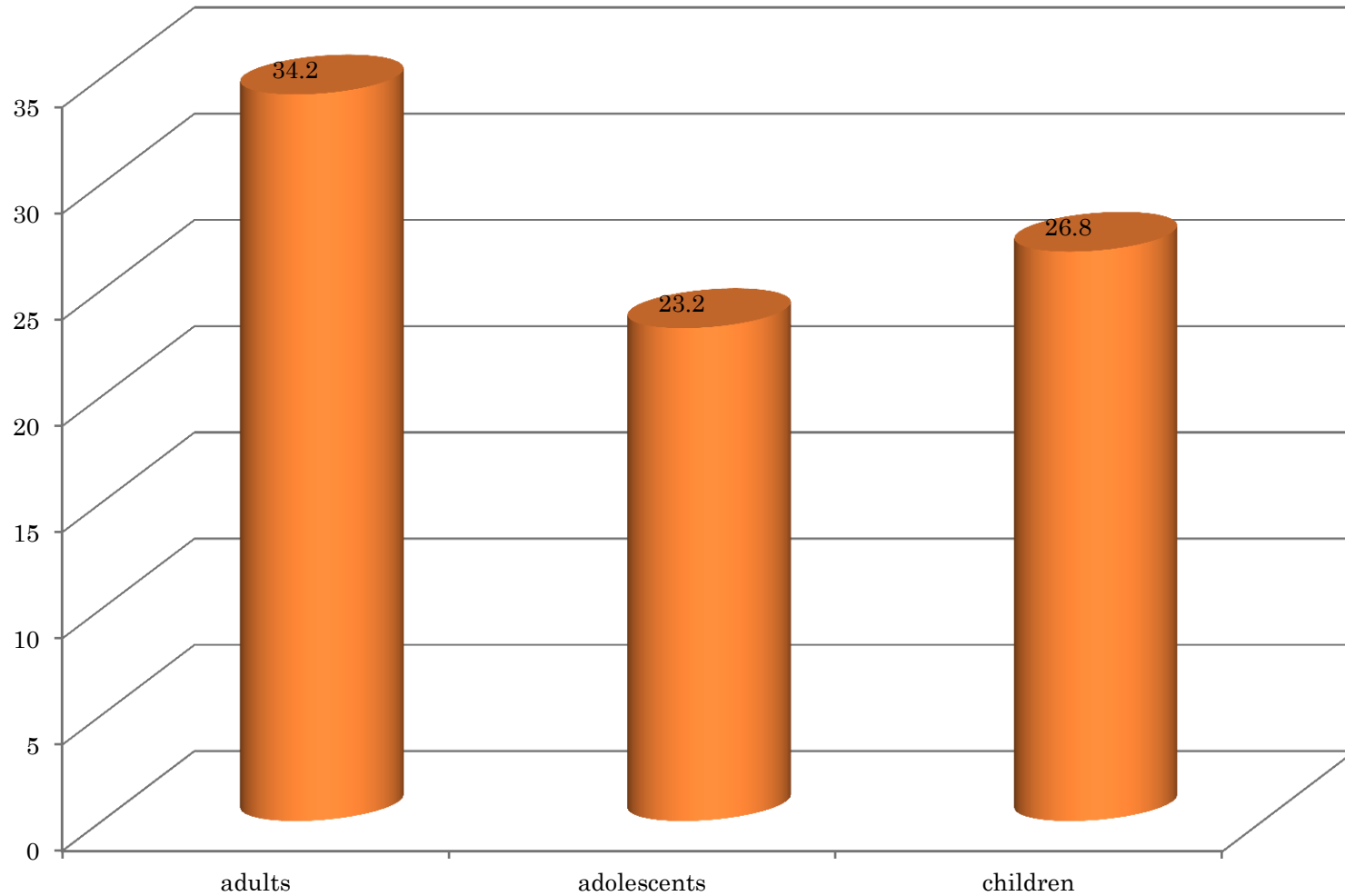


# RESULTS

- Two hundred and seventy two individuals were sampled
- The seroprevalence of *Coxiella burnetti* in humans was 26.8% (73/272)
- The seroprevalence was higher in the irrigation scheme -30.2%(62/205) [95% CI-29.93,30.47] relative to those sampled in the non-irrigated areas -16.4%(11/67) [95% CI-16.24,16.56] (O.R.= 2.2: P< 0.05)
- Seroprevalence was higher among adults(>18 years) compared to children(5-12 years) and adolescents(13-18 years)-figure 1



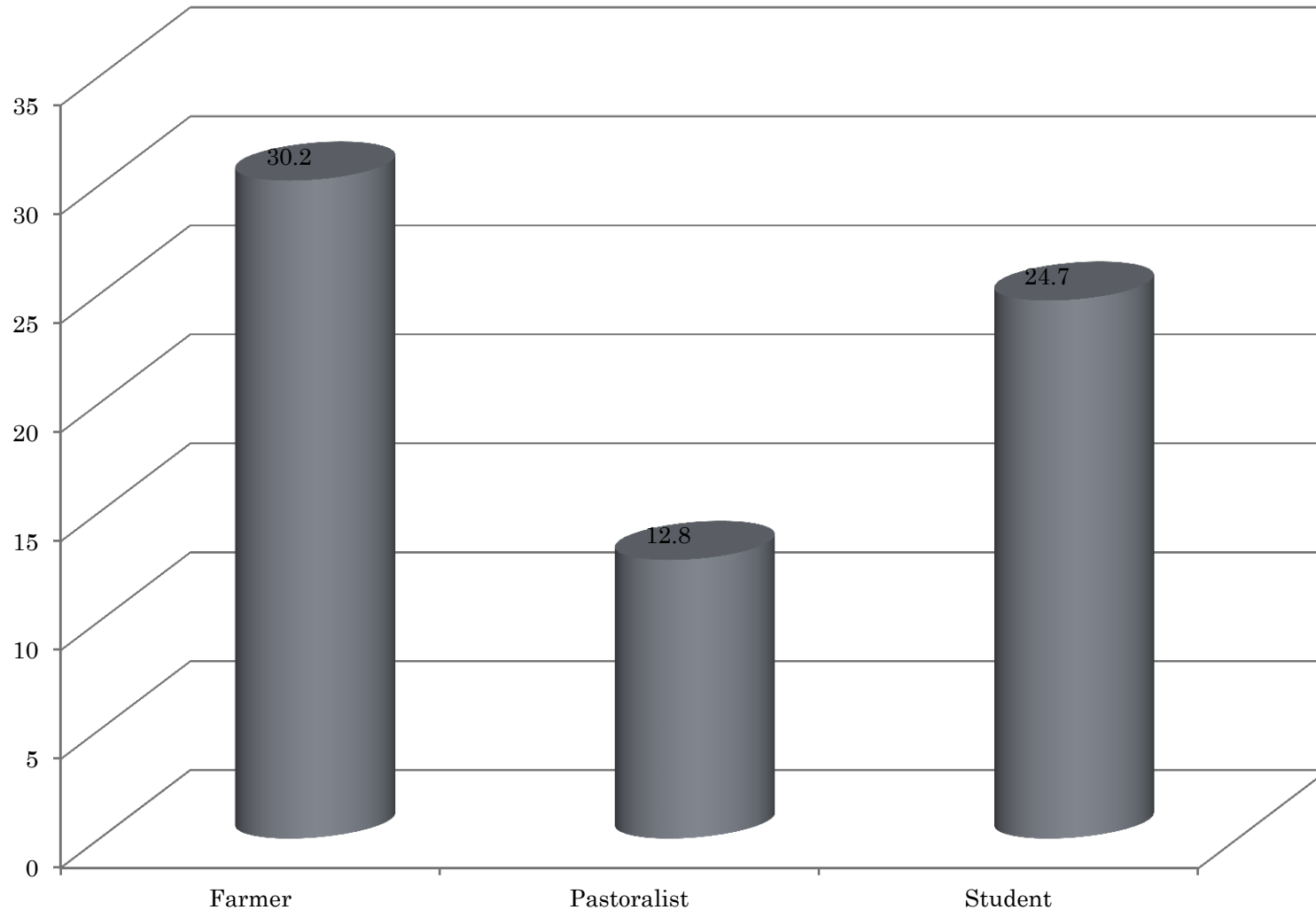
# AGE VS. SEROPREVALENCE (%)-FIGURE1



- There was no difference in the seroprevalence of *Coxiella burnetii* between males and females at 28% and 26%, respectively
- Seroprevalence was higher among farmers at 30.2% compared to pastoralists and students at 12.8% and 24.7% respectively-figure 2



# OCCUPATION VS SEROPREVALENCE (%) - FIGURE 2



# RISK FACTOR ANALYSIS

- The only factors significantly associated with seropositivity were occupation, irrigation status and age ( $P < 0.05$ )
- Pastoralists were less likely to be seropositive for q fever compared to farmers ( $OR = 0.2$ )
- Individuals living within the non-irrigated areas were less likely to be seropositive for q fever compared to those living within the irrigation scheme ( $OR = 0.4$ )



## DISCUSSION

- The seroprevalence of CB in this study at 26.8% was similar to other studies
- Chang *et al.* (2009) and Knobel *et al.* (2013) reported seroprevalences of 26% and 31% in Taiwan and western Kenya respectively
- The seropravelence was higher in adults, due to their cumulative risk of exposure through out their lives relative to adolescents and children





- Though exposure to animals has been reported as a risk factor to high CB seropositivity, the prevalence was lowest in the pastoralists relative to students and farmers. This may be due to these latter groups also coming into contact with animals or other possible routes of transmission such as exposure to infected aerosol which may be playing a significant role in CB transmission



## CONCLUSION AND RECOMMENDATION

- There is a high seroprevalence of CB in humans in Bura Sub-county of Tana River County
- Factors such as occupation and irrigation are important risk factors
- More studies need to be carried out to determine the risk factors and distribution of CB in animals in this area



# ACKNOWLEDGEMENTS

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THANK YOU FOR YOUR ATTENTION

