Gambia-Senegal Sustainable Fisheries Project

USAID/BaNafaa

Second Workshop on Shellfish Sanitation: Developing a Gambian National Shellfish Sanitation Programme

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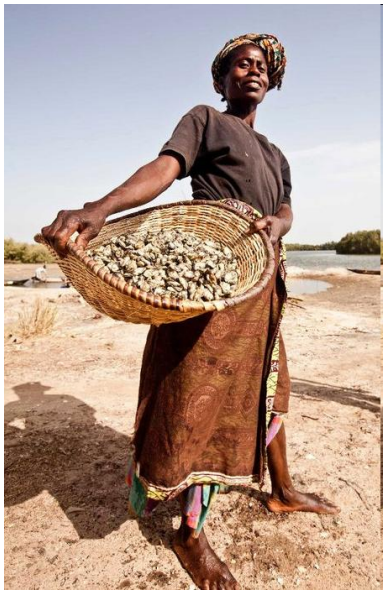
Summary of Workshop Program

- Overview of economics of oyster trade & potential economic value of shellfish sanitation
- Historical development of the NSSP in the U.S.
- Overview of the current U.S. NSSP & Importance of the “Responsible Authority”
- The Shoreline Sanitary Survey as the “keystone” of a Gambian NSSP
- Water quality classifications, the coliform indicators and knowing your estuary
- Enforcement strategies
- Post-harvest strategies

Part 1: Reasons for Establishing a Gambian National Shellfish Sanitation Programme

Value of oysters Rhode Island and Gambia



- Oysters are filter feeders
- Pathogens picked up during filter feeding
- Pathogens & indicators increase in warm temperatures
- Prices received are dependent upon consumer confidence

Facts About Rhode Island

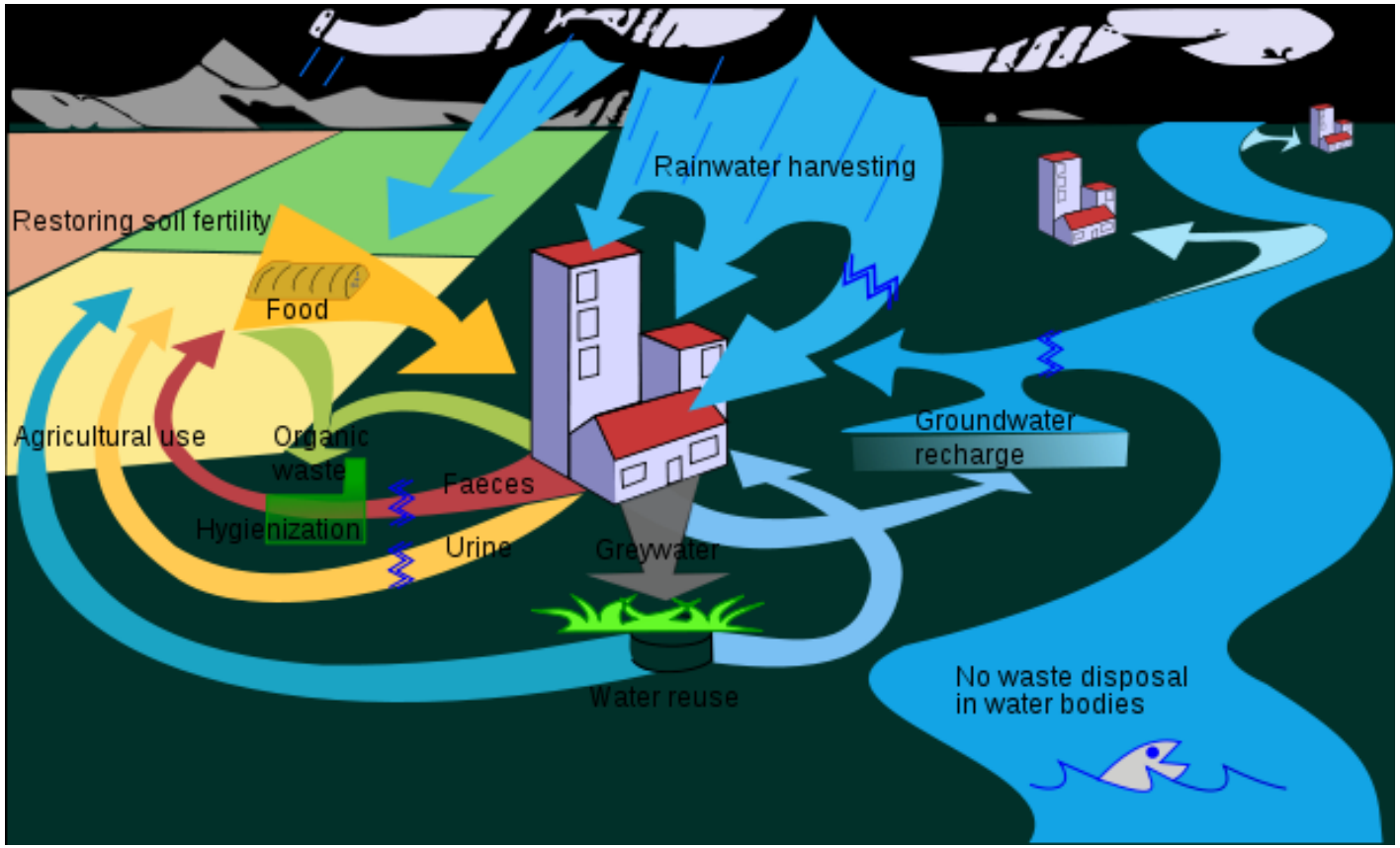
	Rhode Island	*Gambia*
Area	3,140 km^2	10,380 km^2
% water	13.9%	11.5%
Population	1,050,300	1,705,000
Density	388.0/km^2	164.2/km^2

Growth of Shellfisheries in Rhode Island

- Shellfisheries documented 1643
- 1734 statute on using oysters in lime kilns
- Oysters farmed in Rhode Island since 1798
- Oysters considered important food before refrigeration
- By 1910, there were 8500 ha of oyster farms in Rhode Island

Oyster marketing in Rhode Island 1908

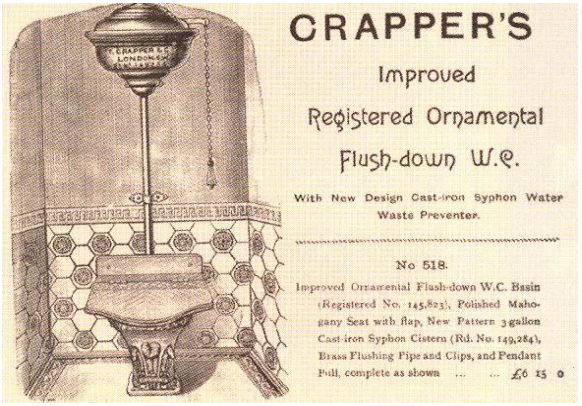
Ecological Recycling of Wastes



Ecological Recycling of Wastes

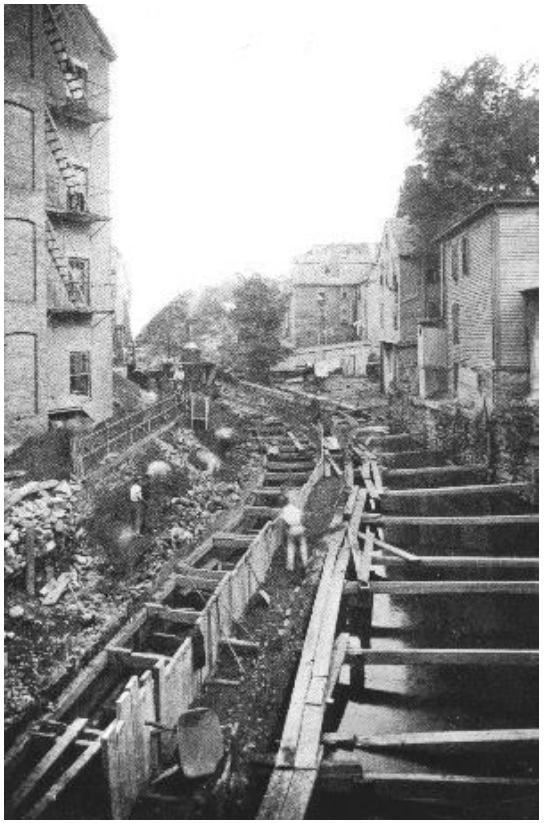
Invention of the flush toilet greatly increases sewage to Narragansett Bay

- *1901*
  The Providence Sewage Treatment System is put into operation. The chemical precipitation plant, the third of its kind in the United States, is the largest of its type ever built. The system consists of a pumping station at Ernest Street to lift sewage to Field's Point for treatment.



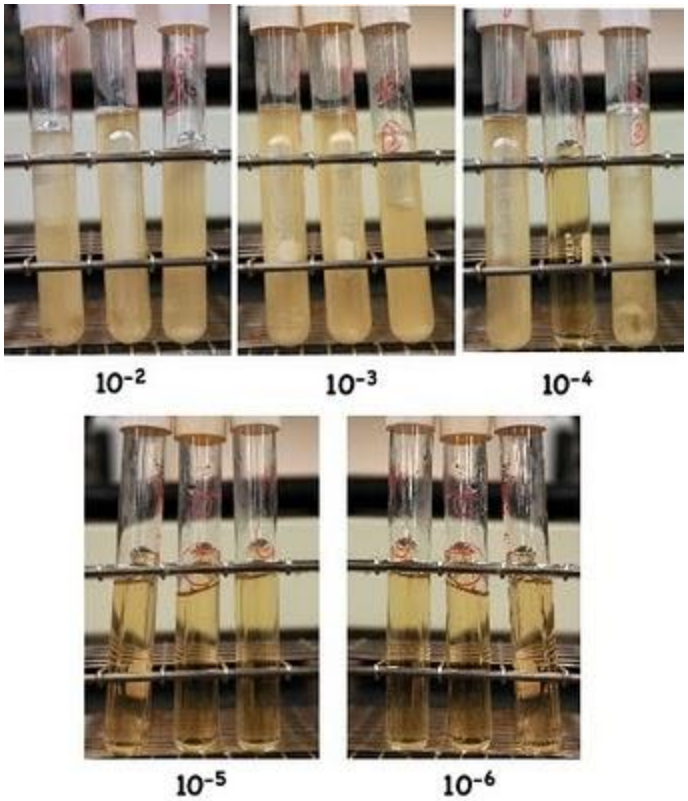
Consequences of the Sewer System

- Incidences of water-borne diseases down 80% or more in the city
- Millions of liters of wastewater into Narragansett Bay
- Increase of bacterial diseases (typhoid & cholera) associated with eating shellfish
- Concerns by public health officials about epidemics
- Several wealthy individuals die from shellfish – calls for action

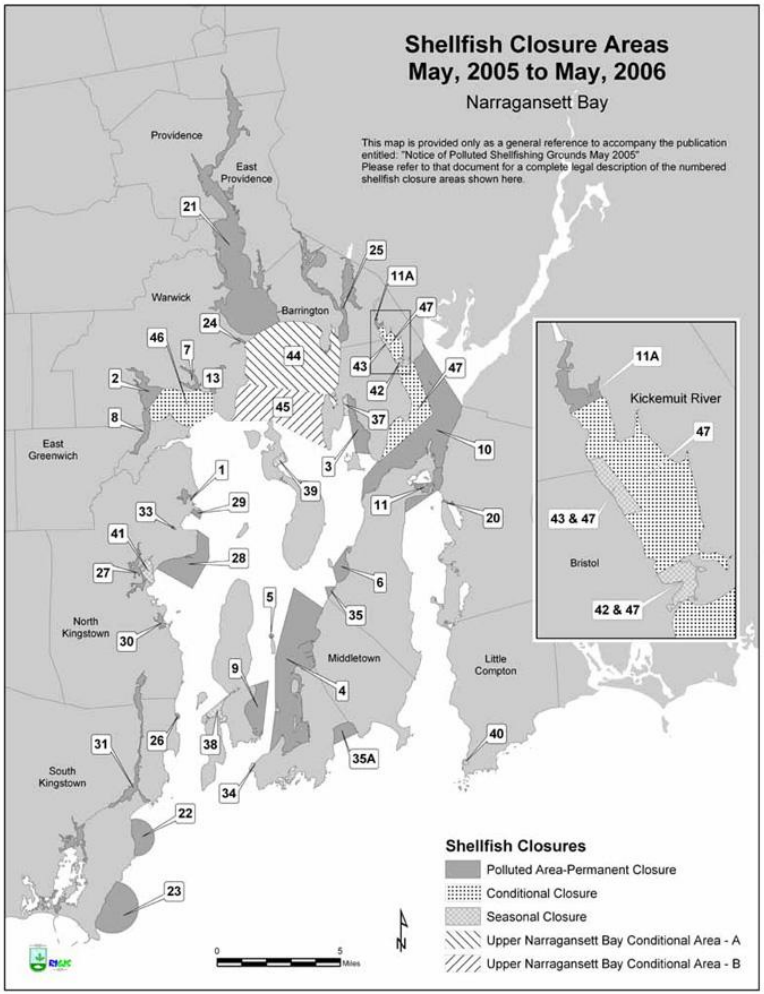


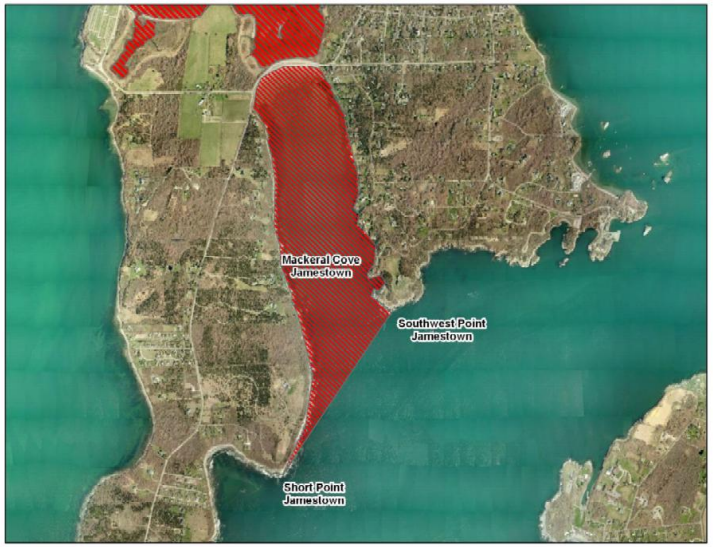
Development of the NSSP

- About 1905 first work to establish sanitary shoreline surveys to spot pollution sources
- The multiple-tube fermentation technique for coliform analysis (McCrady, M.H. 1915. *The Numerical Interpretation of Fermentation Tube Results.* J. Infect. Dis. 17:183)
- NSSP adopted in 1925 by shellfish-producing states



Example Water Quality Classification Maps





Part 2: Overview of the Current U.S. National Shellfish Sanitation Program and Implementation by the States

Provisions of the U.S. NSSP

U.S. National Shellfish Sanitation Program

Standard Operating Procedures of Rhode Island under the NSSP

RIDEM Standard Operating Procedures for Shellfish Sanitation

Part 3: Possible steps for establishing and implementing a Gambian NSSP

Developing Gambian NSSP based on interagency MOU

- Decide specific tasks required for a G-NSSP --- Perhaps use model ordinance as guide
- Develop standard operating procedures for fulfilling required tasks --- Perhaps use RI SOPs for a guide
- Develop MOU as part of the SOPs specifying responsibility of each agency
- Identify funding mechanism for interagency cooperation

Identification and remediation of known fecal contamination

- First, identify, define & map shellfish growing waters
- Pre-identify potential sources of contaminants
  - Google Earth to locate major problem areas
  - Use of local knowledge and public records
- Establish baseline conditions in pre-defined areas by walking the shoreline – pinpoint location by simple GPS device
- Use spreadsheet to establish database of problem areas

Identifying potential problem areas by satellite imagery: Example 1

Identifying potential problem areas by satellite imagery: Example 2

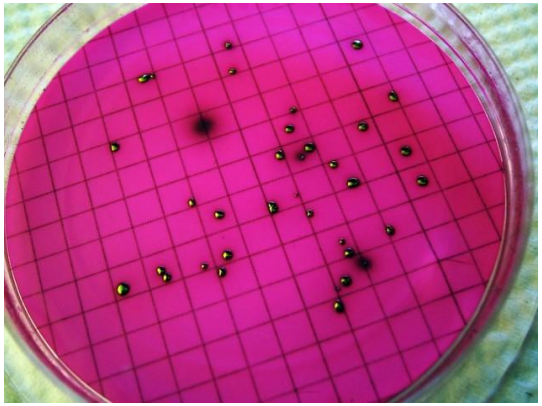
Identifying potential problem areas by satellite imagery: Example 3

Implementing Sanitary Shoreline Surveys

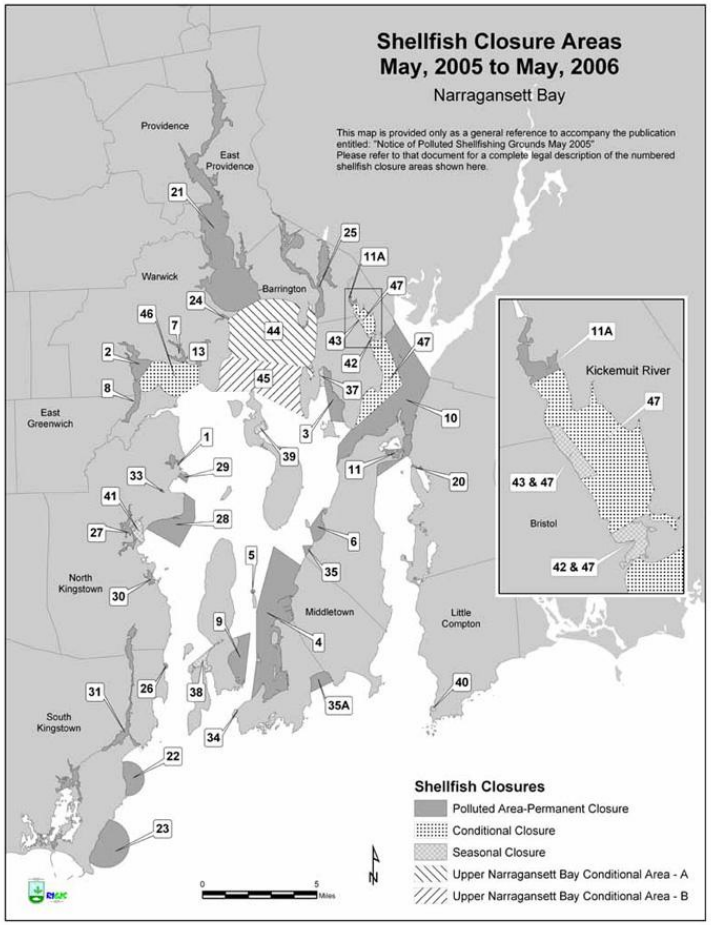
- Make sure defined survey areas sized to be able to complete survey in about 4 hours
- Conduct baseline survey and record results in spreadsheet
- Update surveys periodically
- Survey data is multipurpose
  - Prioritization for remediation
  - Establishing water quality classification zones

Steps to establish water quality classifications

- Baseline testing of coliform bacteria in Tanbi estuary underway
- Update surveys periodically
- Survey data is multipurpose
  - Prioritization for remediation
  - Establishing water quality classification zones
- Data records need to be maintained over decades to document trends in remediation



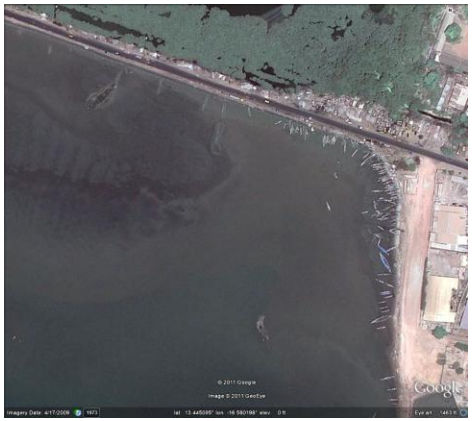
General Criteria for Establishment Water Classification Zones



- Close known areas based on known effluents
- Choose areas with access point for survey & water sampling
- Choose area sizes to aid surveying in short time

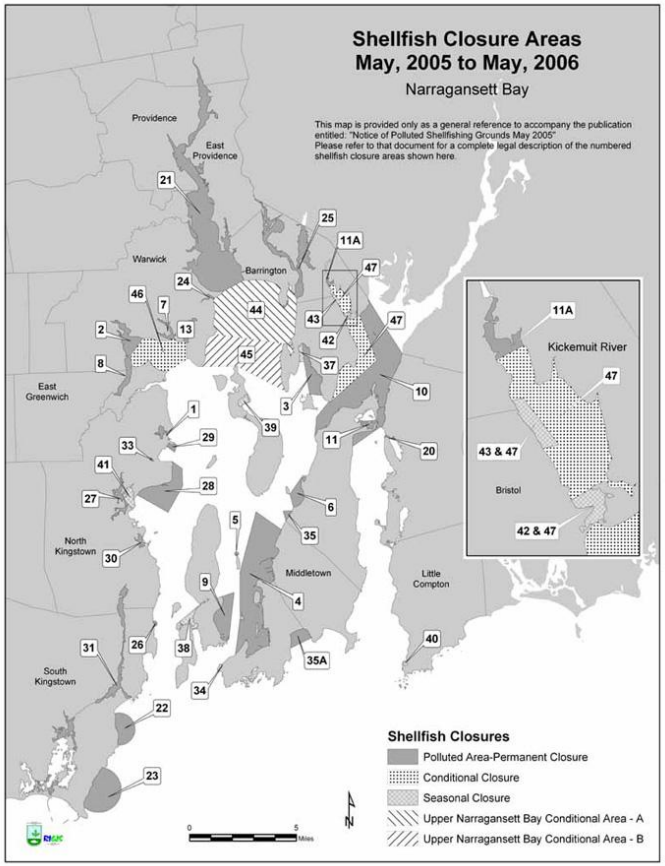
General Criteria for Establishment of Shellfishery Closure Areas

- Data from shoreline surveys
  - areas within ½ km of shoreline village
  - areas with concentrated runoff (e.g. Bond Road floodgates)
  - boat landing areas
  - ½ km from areas with animal raising close to water
  - areas near dumpsites
- Rainfall data
  - rainy season blanket closure: season of known highest coliforms

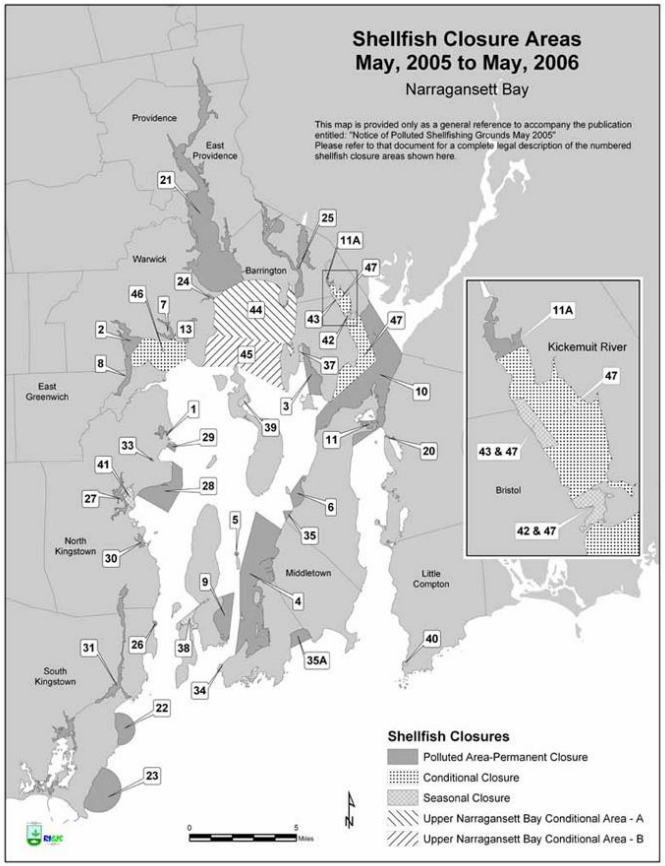


More Criteria for Establishment of Shellfishery Closure Areas

- Dry season coliform data
  - Areas with mean total coliform >70 colonies/100mL with no more than 10% of samples above 100 colonies/ 100mL
- Refined rainfall data
  - Salinity profile of estuary
  - Timing to establish dry season salinities
  - Establishing “conditional closure areas”



Enforcement of Closure Areas



- Enforcement of regulations key to success
- What would system in Gambia look like?

Post-Harvest Shellfish Sanitation Criteria

- Coliforms multiply in tissues with warmth
- Temperature control from harvest to plate
- Traceability from harvest to plate
- Sanitary shucking facilities
- Periodic coliform testing of meats
- Market monitoring
- How would it work in Gambia?

Thank you -- Jere jef -- On jaaraama
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