



**How can drones can be used in animal health.  
A pilot study in diagnosis of Lumpy Skin Disease.  
Advantages and disadvantages in the use of drones.**

**Dr Michel Bellaiche**

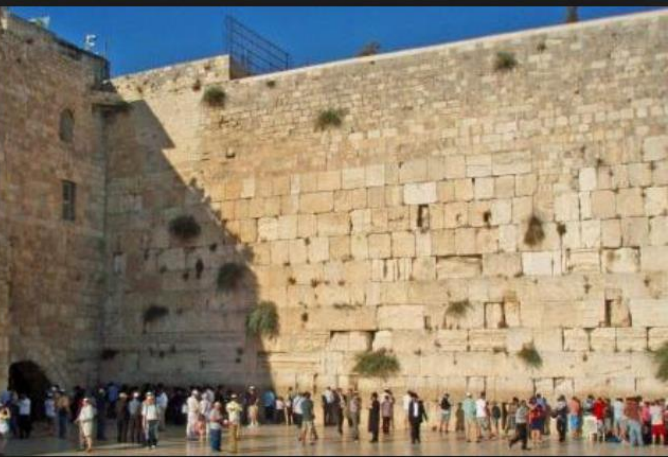
Deputy, Director Kimron Veterinary Institute

Head, Epidemiology Department

Israeli Veterinary Services

**OIE workshop - 04 May 2022**





# Livestock in Israel (heads)



**Cattle**

**450,000**



**Buffaloes**

**300**



**Sheep**

**435,000**



**Goats**

**85,000**



**Camels**

**3,000**



**Pigs**

**200,000**



**Poultry**

**45 millions (at any given moment)**



**Fish**

**25,000 tons (production per year)**



**Bee hives**

**80,000**



Diverse climates

Long summer  
short winter







## Lumpy skin disease as an example





# Clinical manifestations

- **Lumps: round confined areas of erected hair, measuring 0.5 to 7cm in diameter.**
- **They are firm and slightly raised above the surrounding normal skin.**
- **The lesions are of full skin thickness involving the epidermis, dermis and adjacent subcutis. L. nodes.**
- **Possibility of aging the lumps.**





# Clinical manifestations

- The morbidity rates in LSD is up to 95%
- The mortality rates in LSD is up to 25%
- The course of the disease and healing is very slow.



# Economic losses

- ❖ Fertility
- ❖ Milk yield
- ❖ Quarantine measures
- ❖ Deaths and euthanasia
- ❖ Treatment
- ❖ Decline of animal value



Animal welfare issues



















# Surveillance













# Outbreak of LSD in 2012-2013







Beef

Milk









Beef

Milk





11/08-20/08



Beef

Milk







Beef

Milk







Beef

Milk

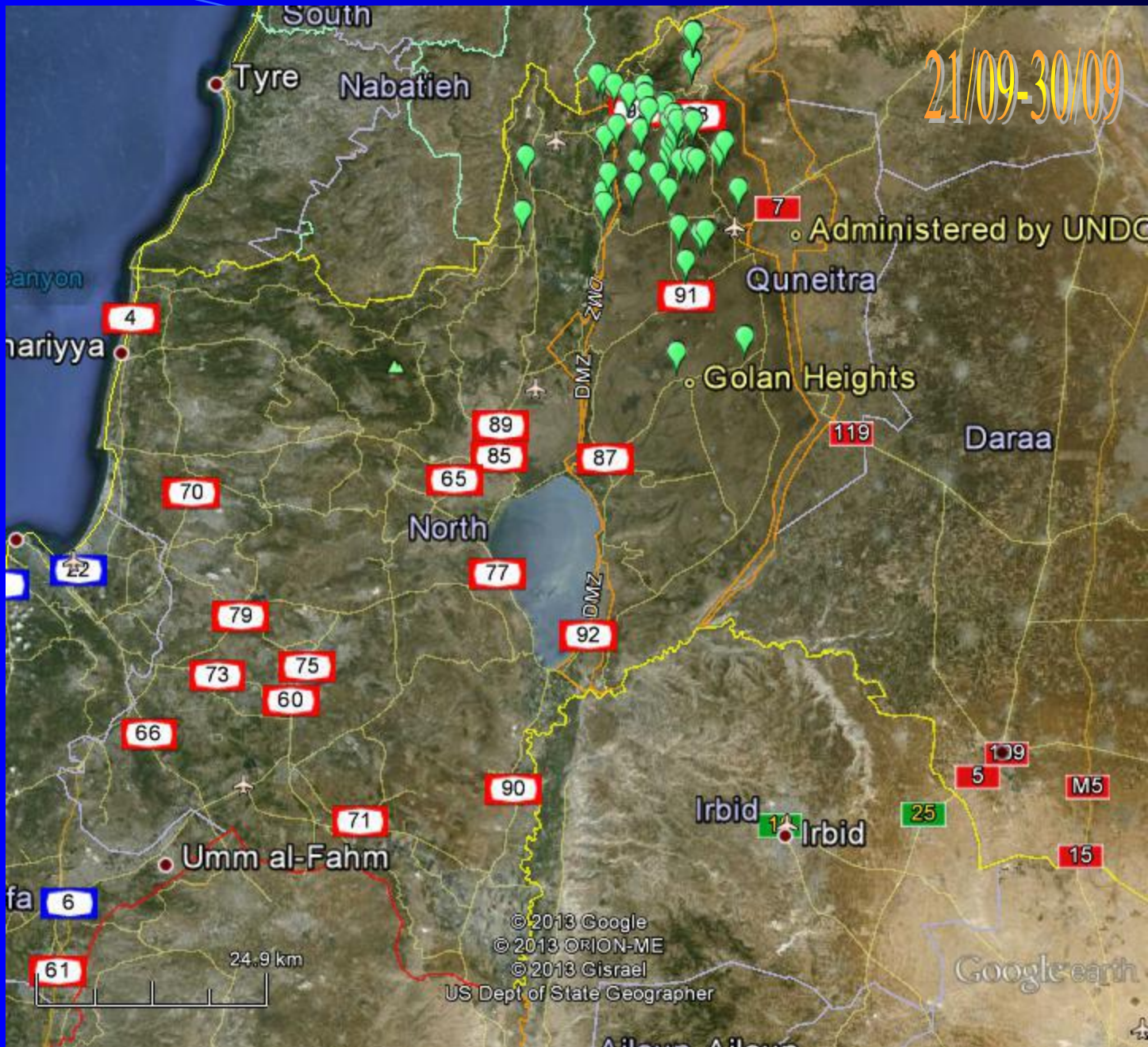




11/09-20/09







Beef

Milk







Beef

Milk





11/10-20/10

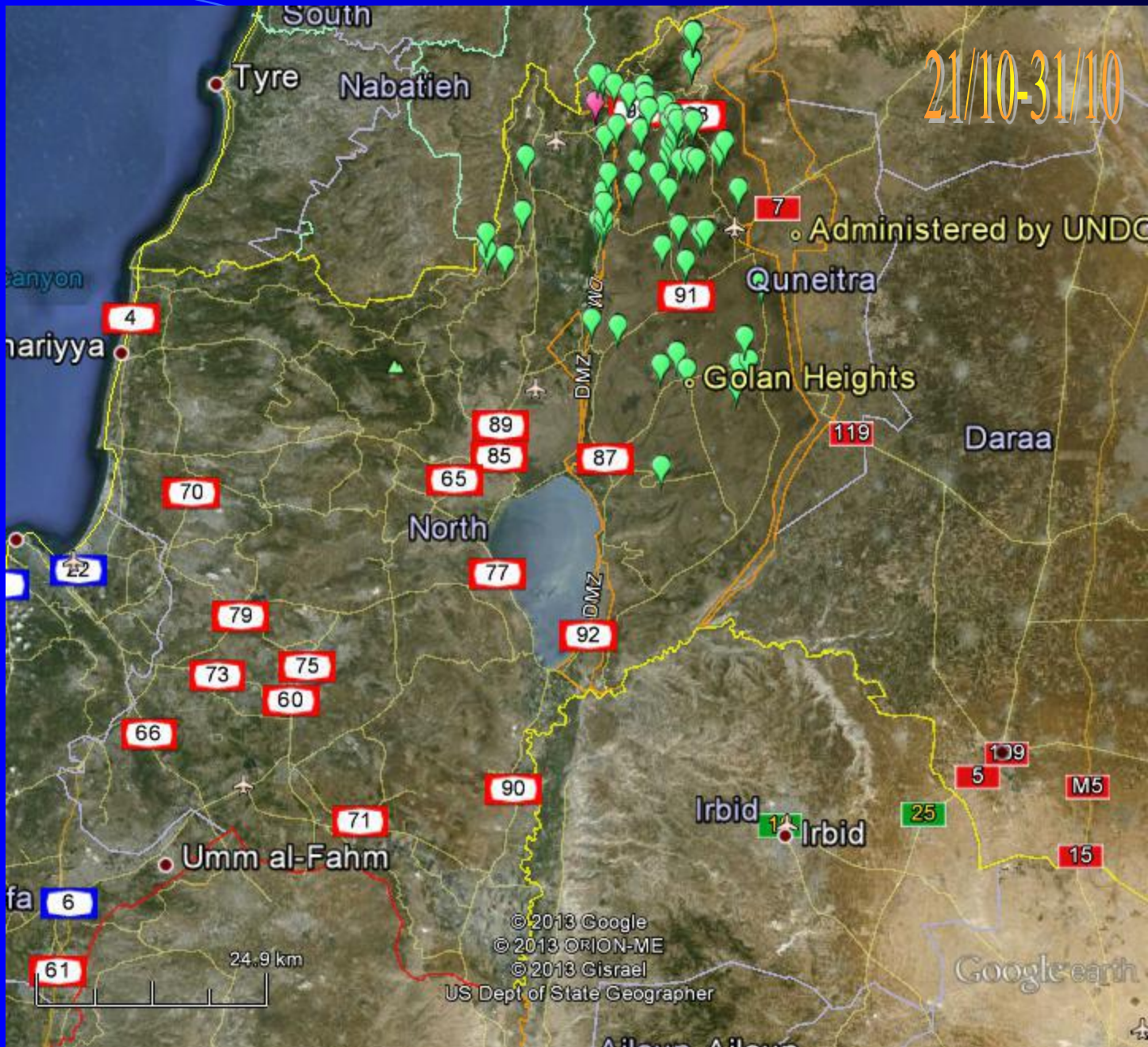


Beef

Milk







Beef

Milk





01/11-10/11



Beef

Milk





11/11-20/11



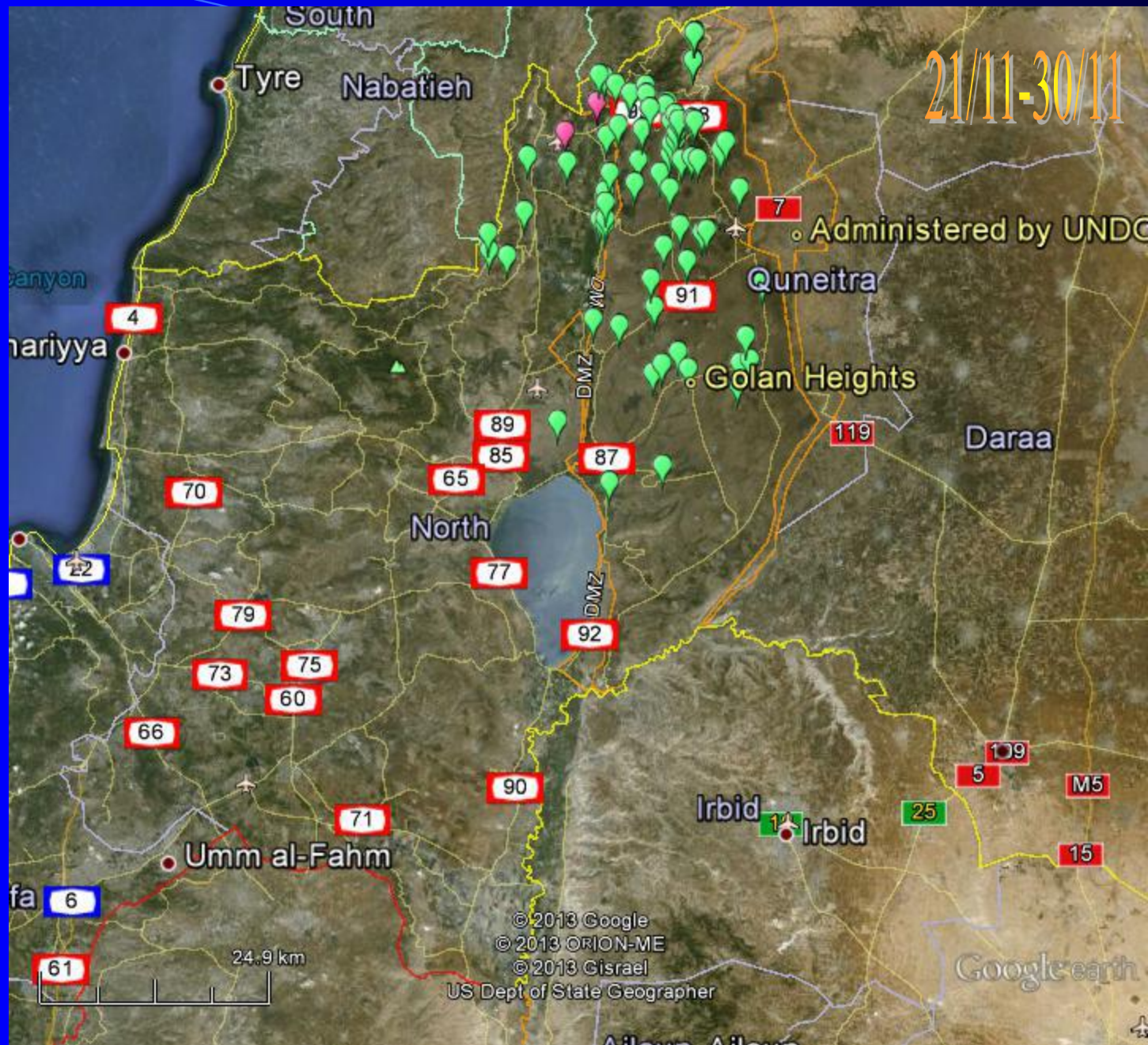
Beef

Milk





21/11-30/11



Beef

Milk





01/12-10/12



Beef

Milk





11/12-20/12



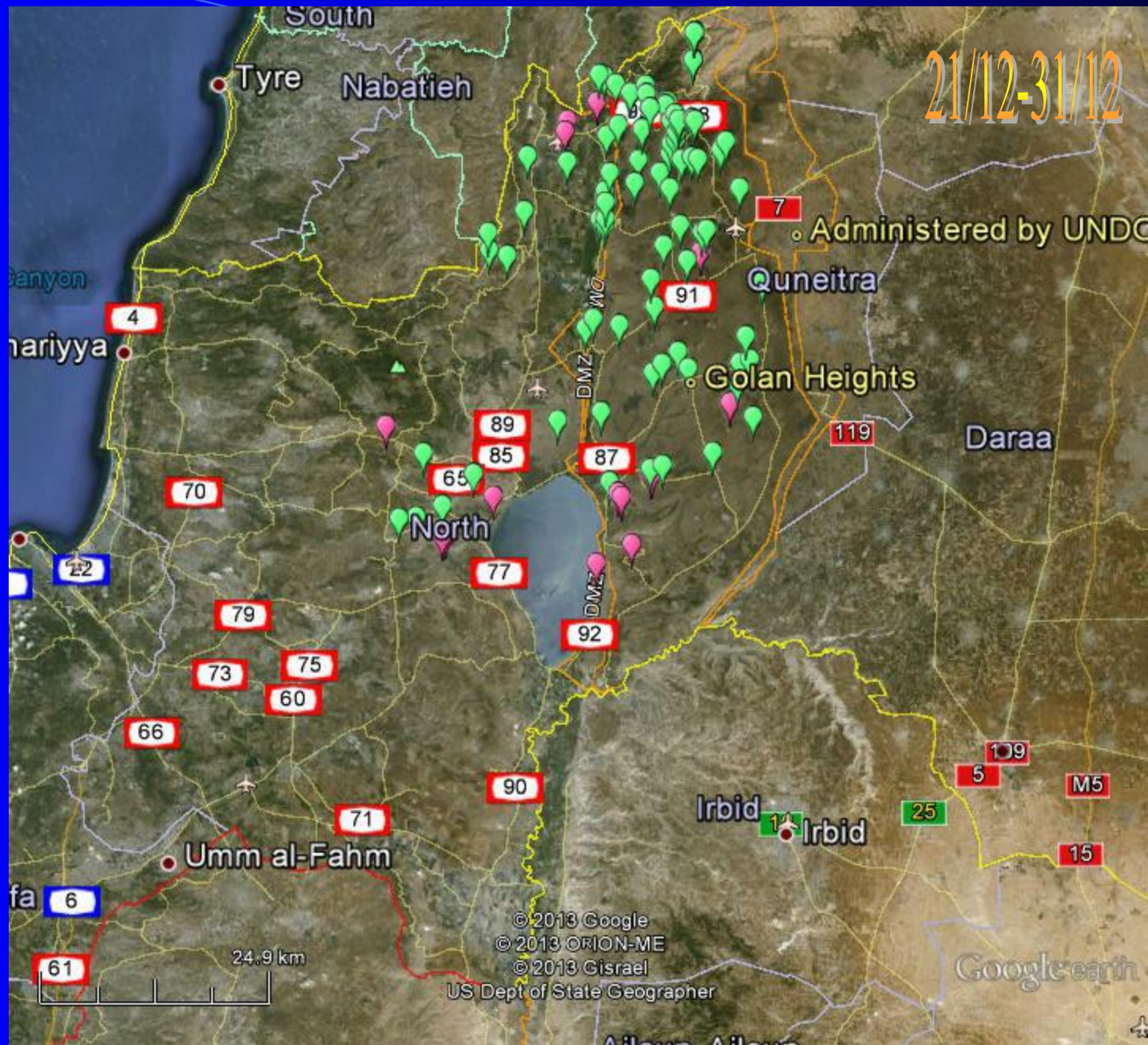
Beef

Milk





21/12-31/12



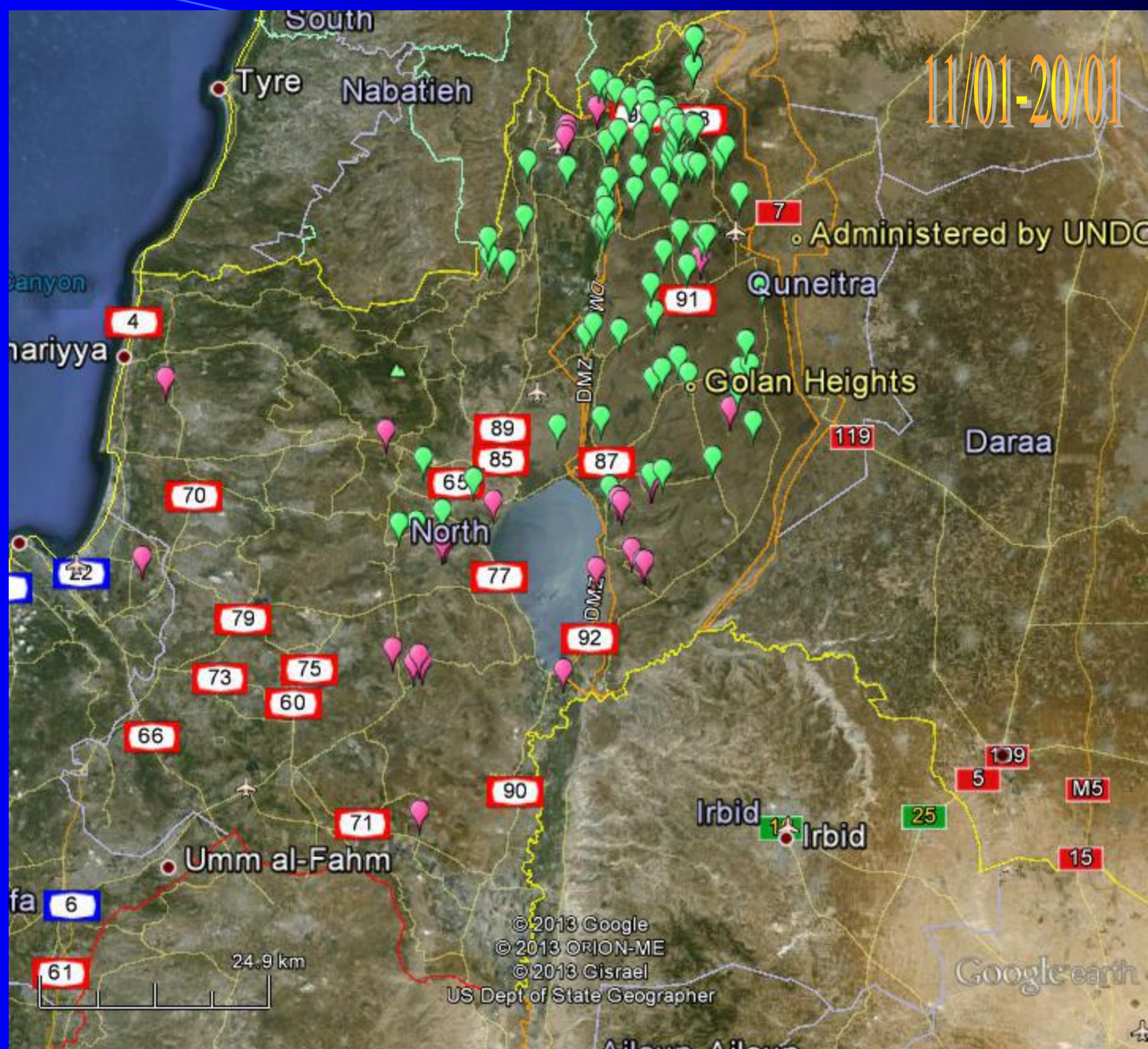
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Milk





11/01-20/01



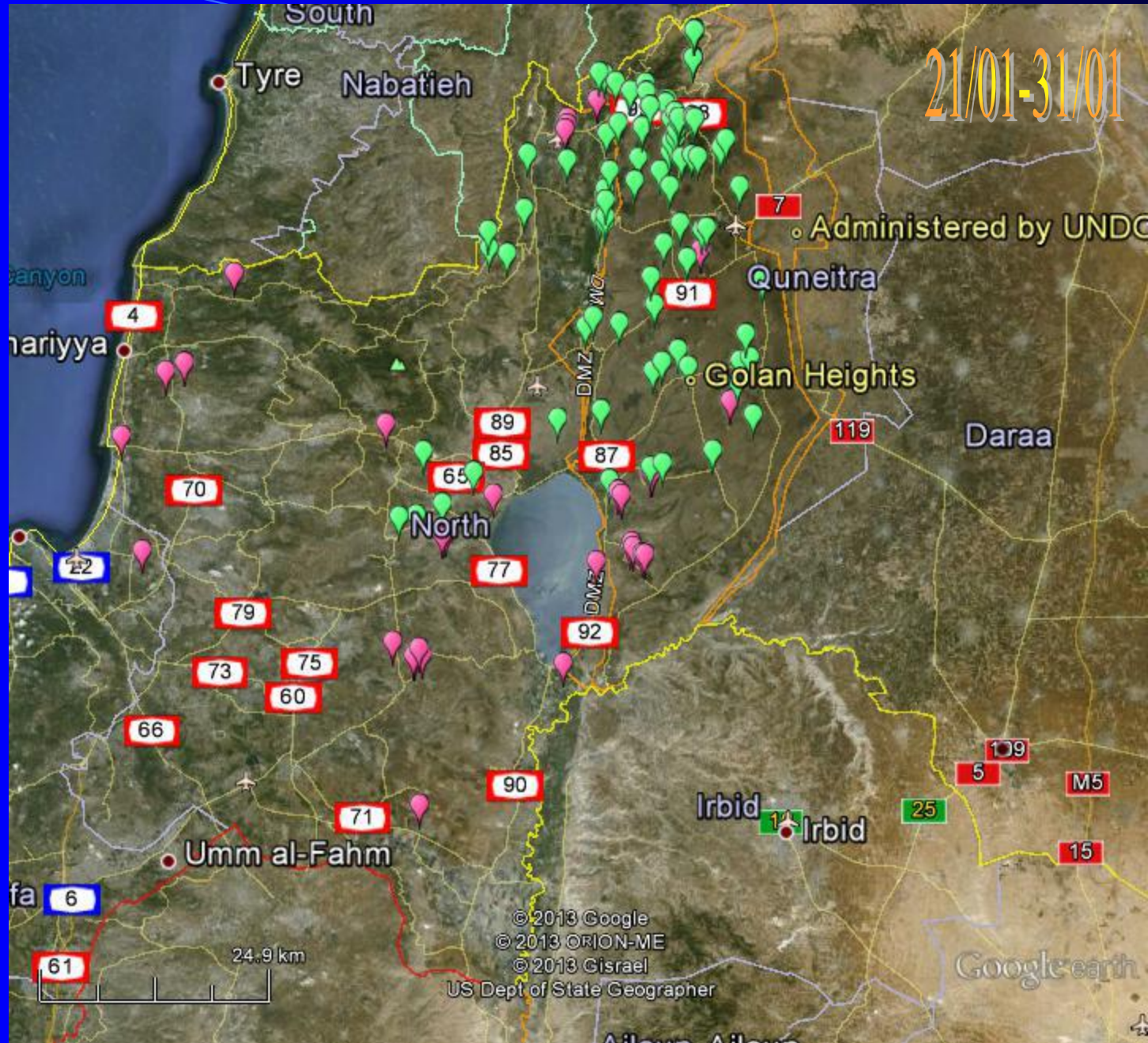
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Milk





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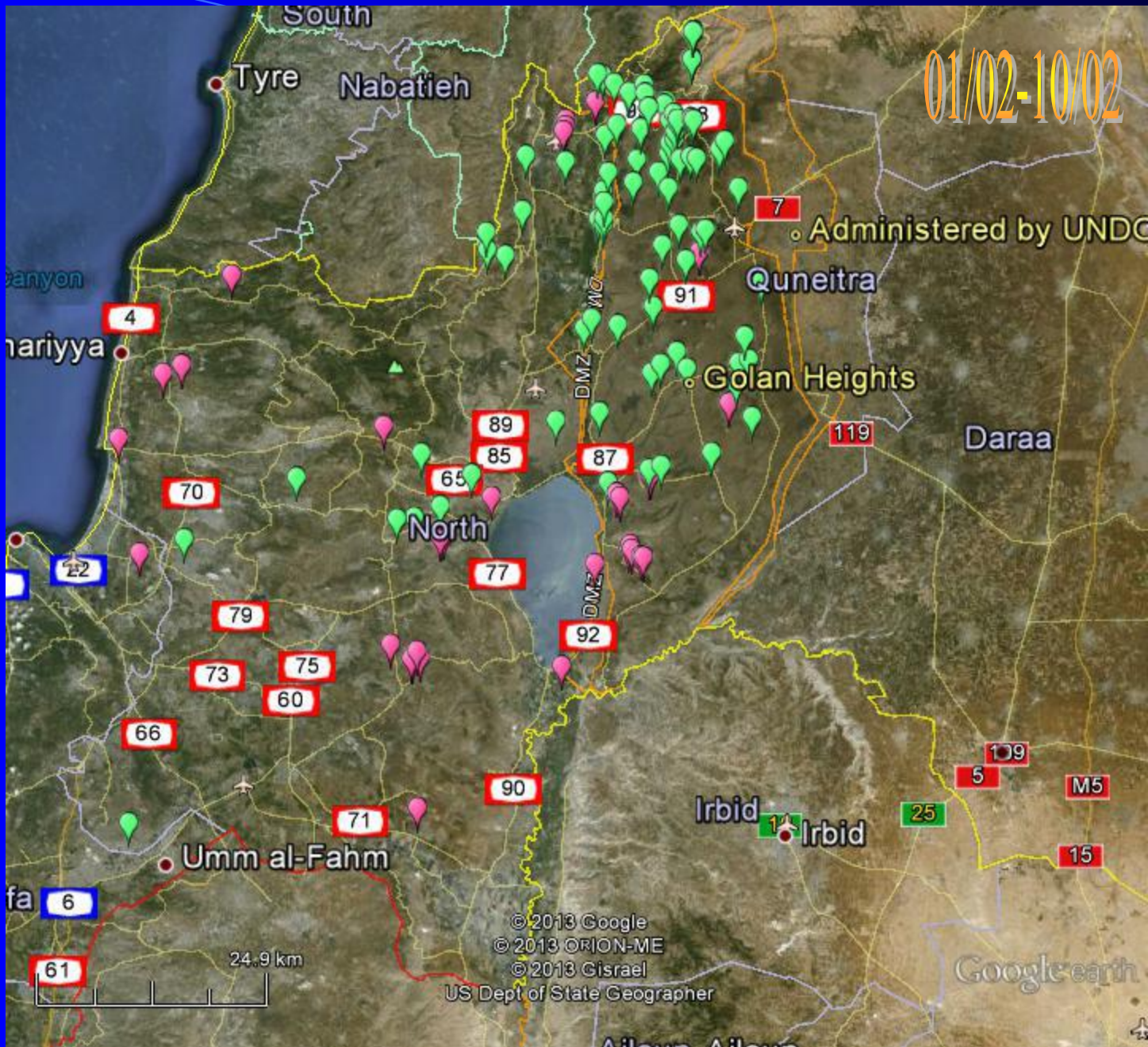


Beef

Milk







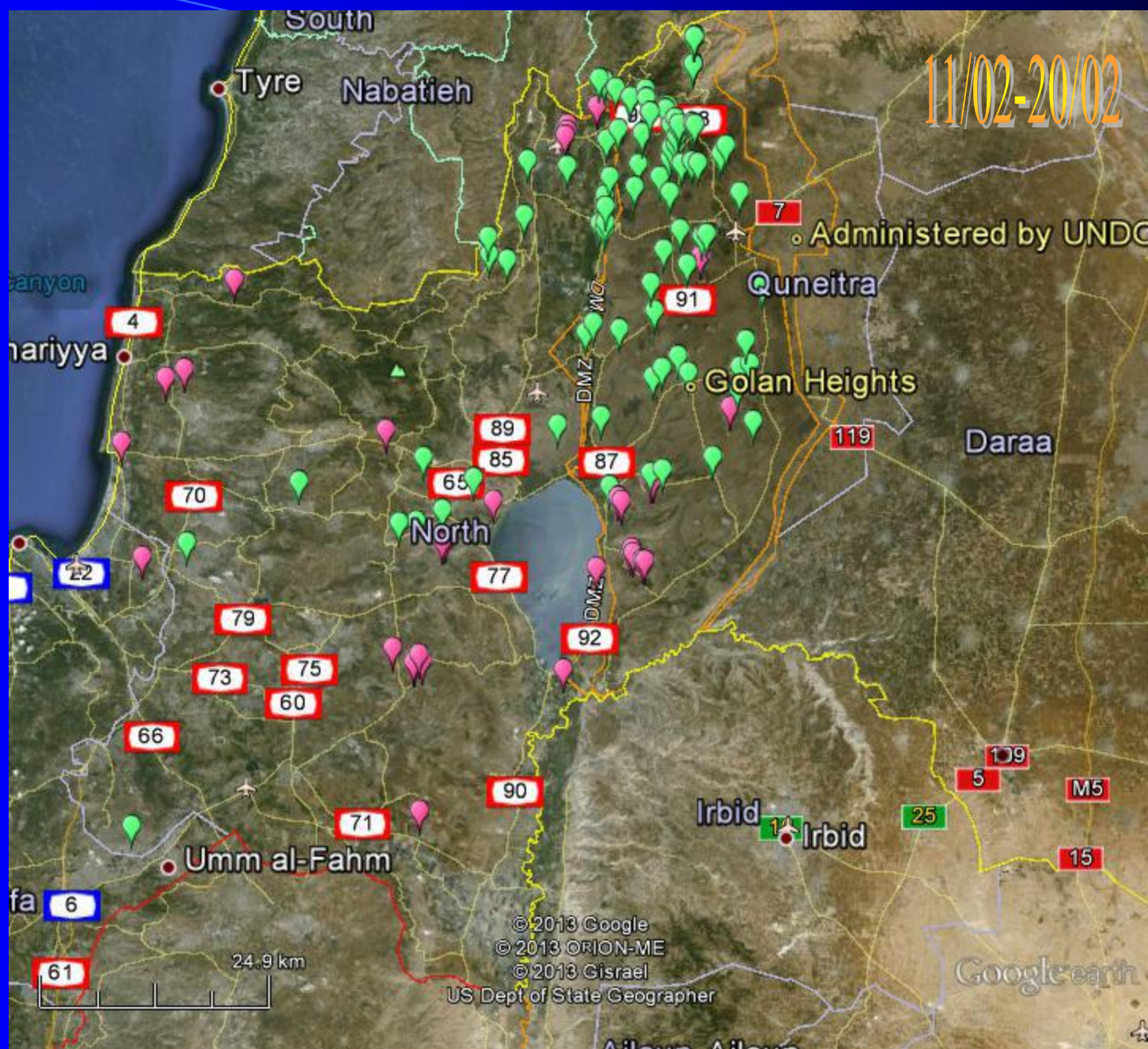
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Milk





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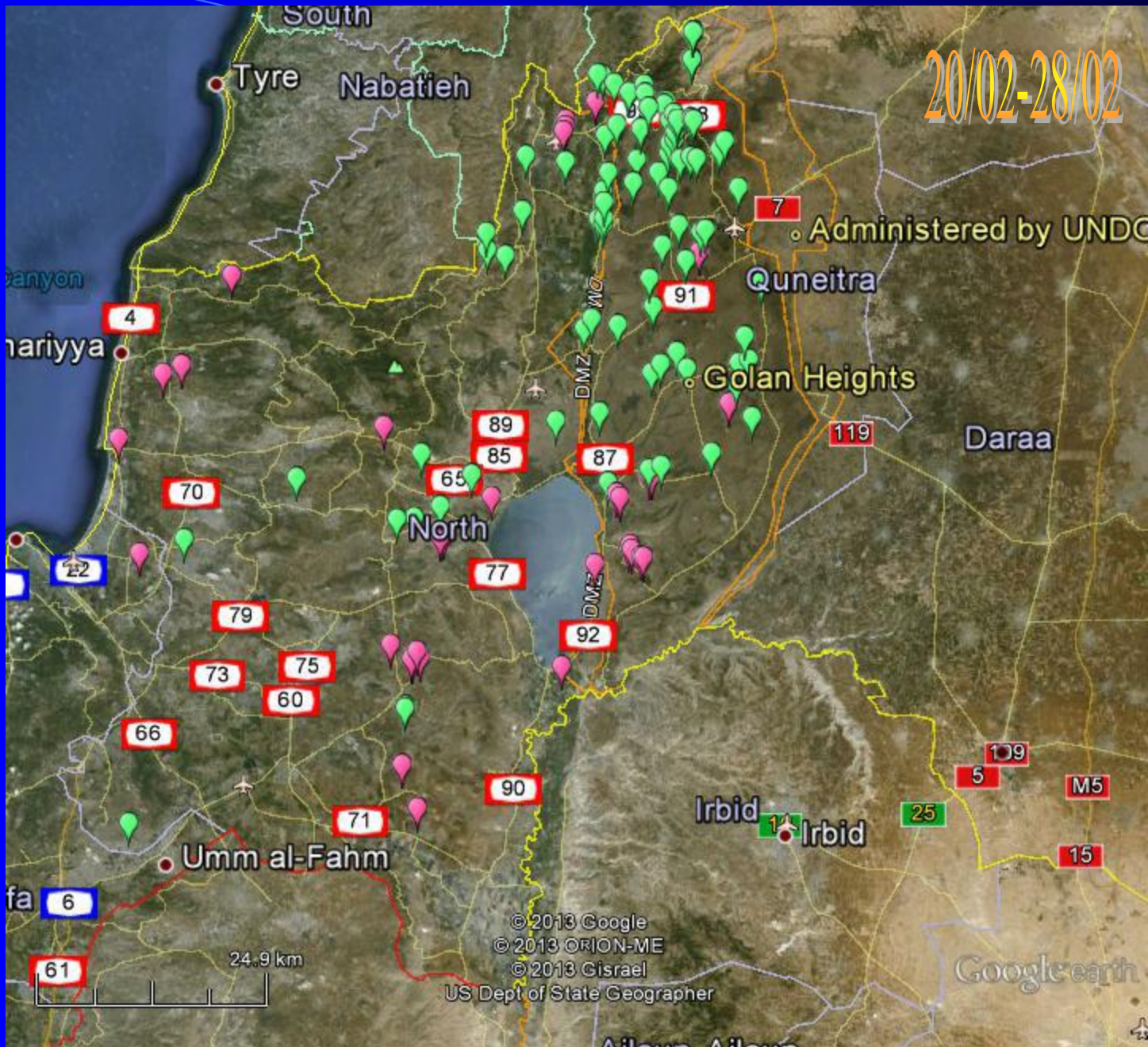


Beef

Milk







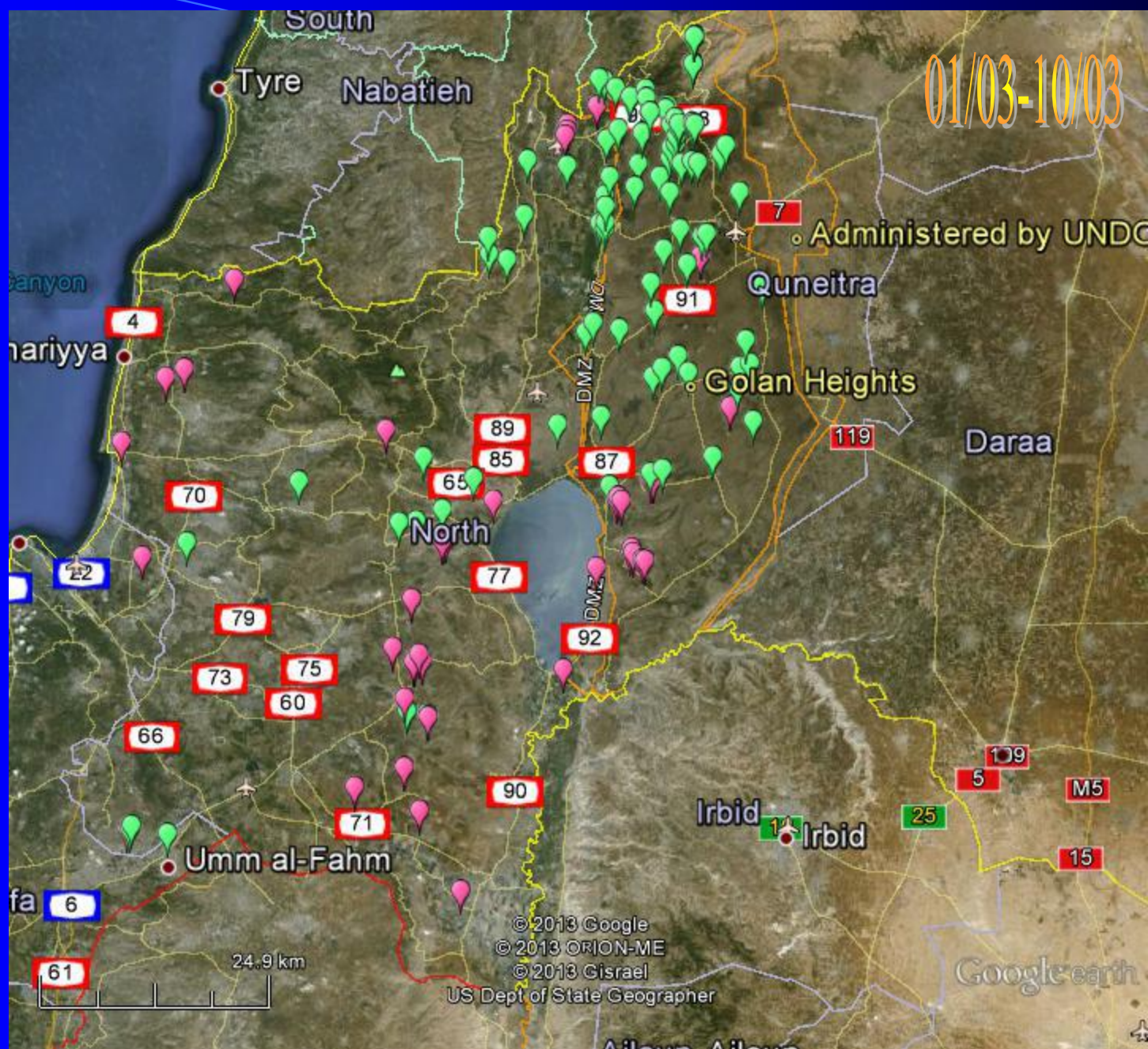
Beef

Milk





01/03-10/03



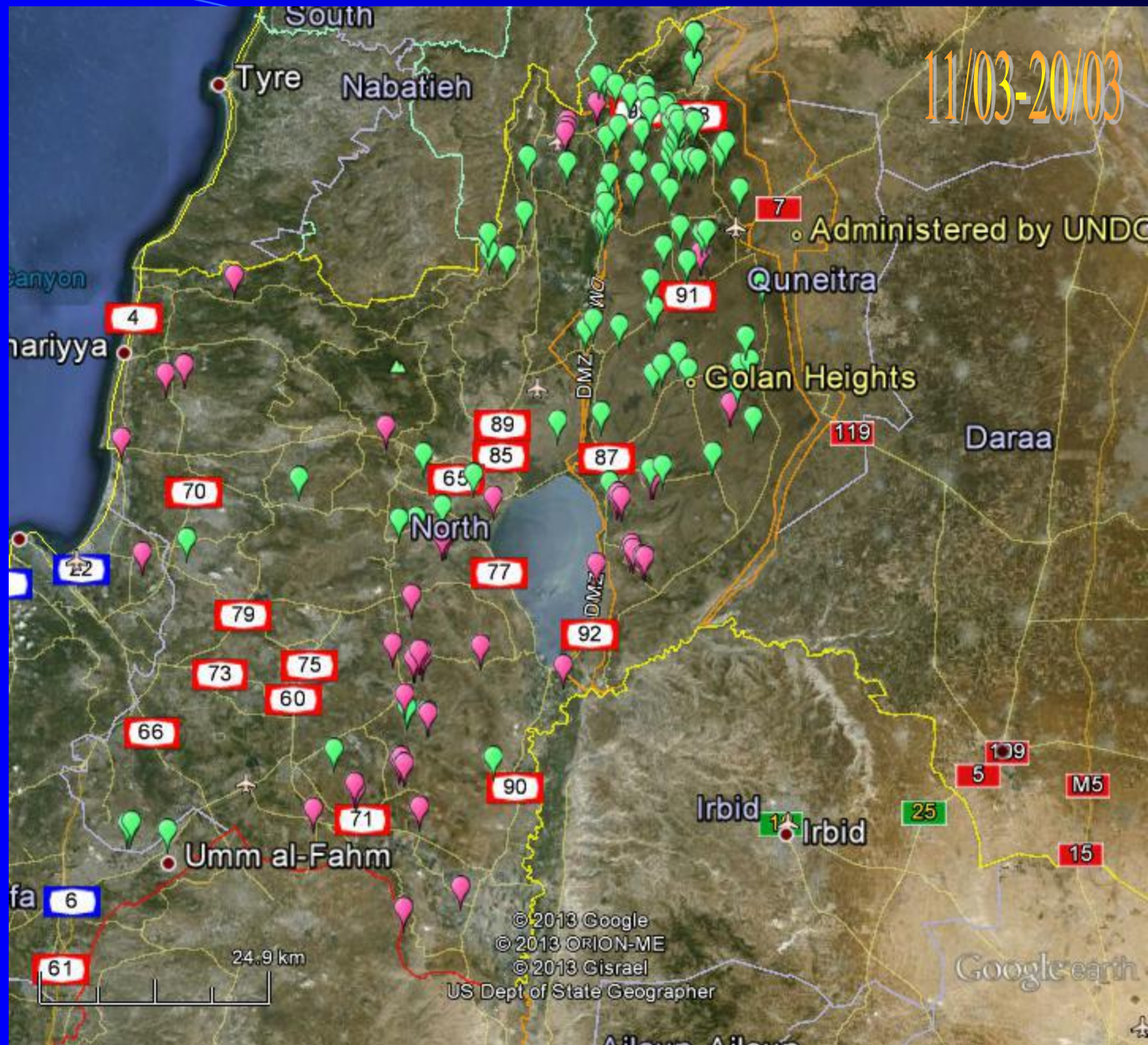
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Milk





11/03-20/03



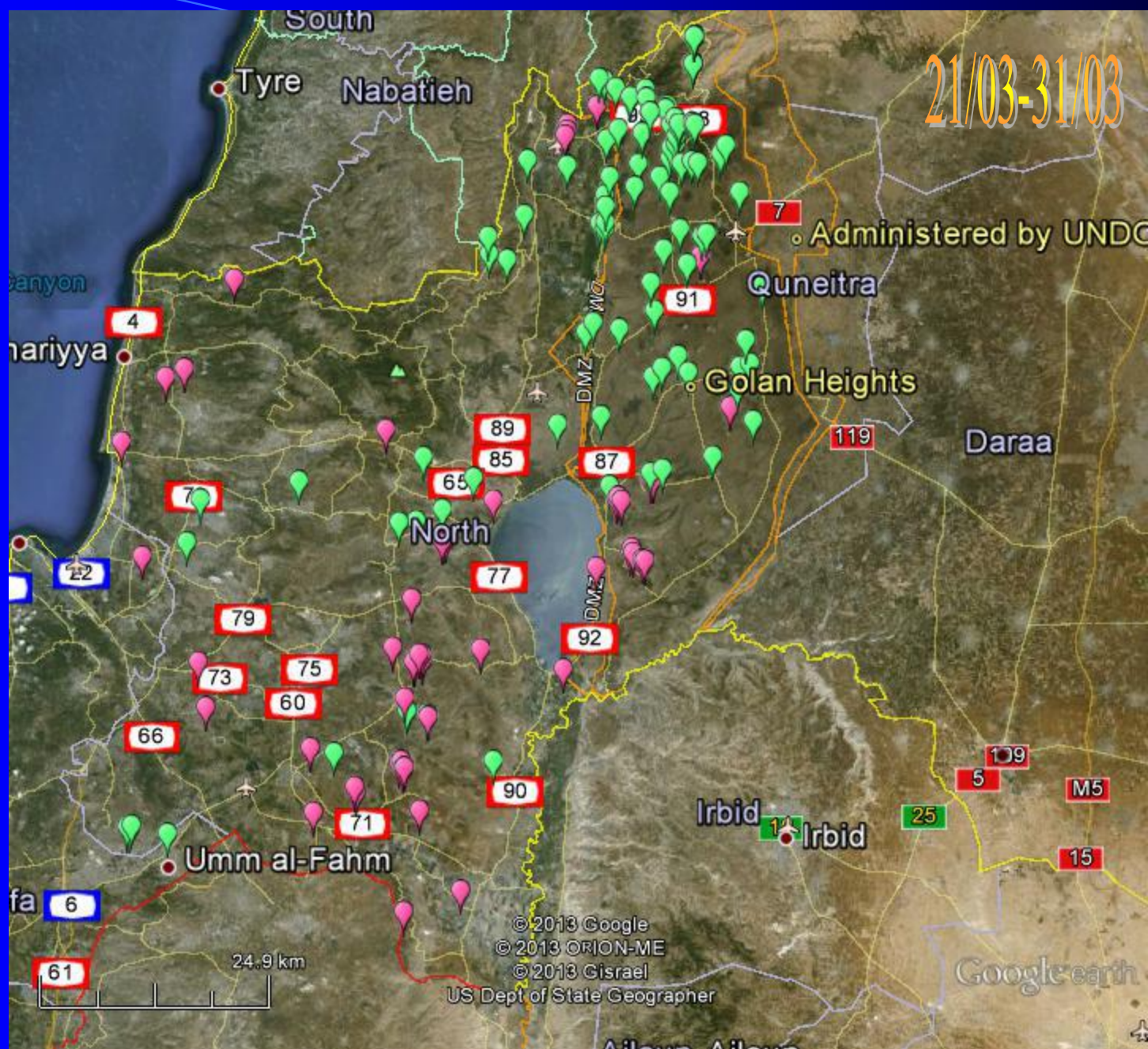
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Milk





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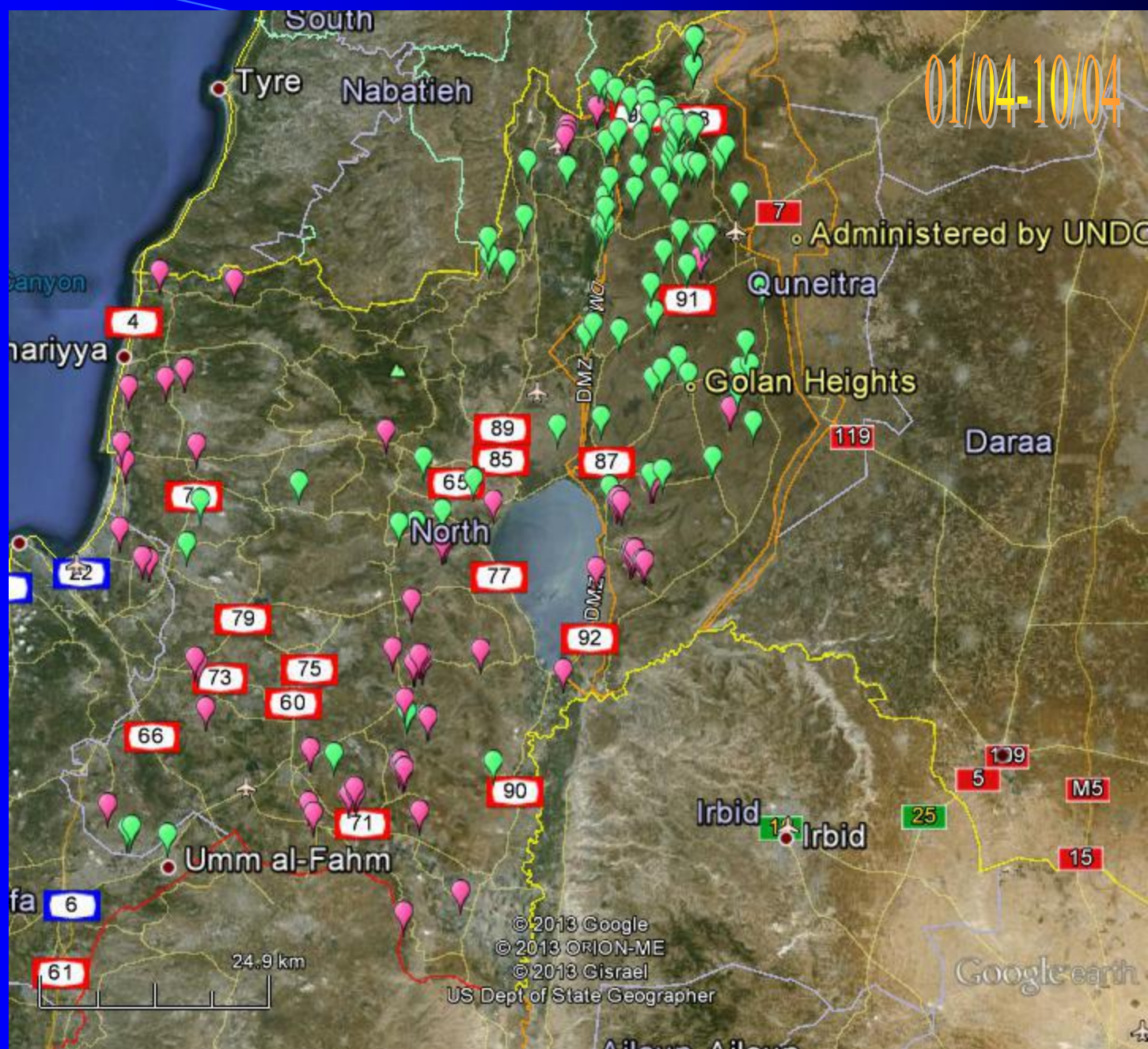
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Milk





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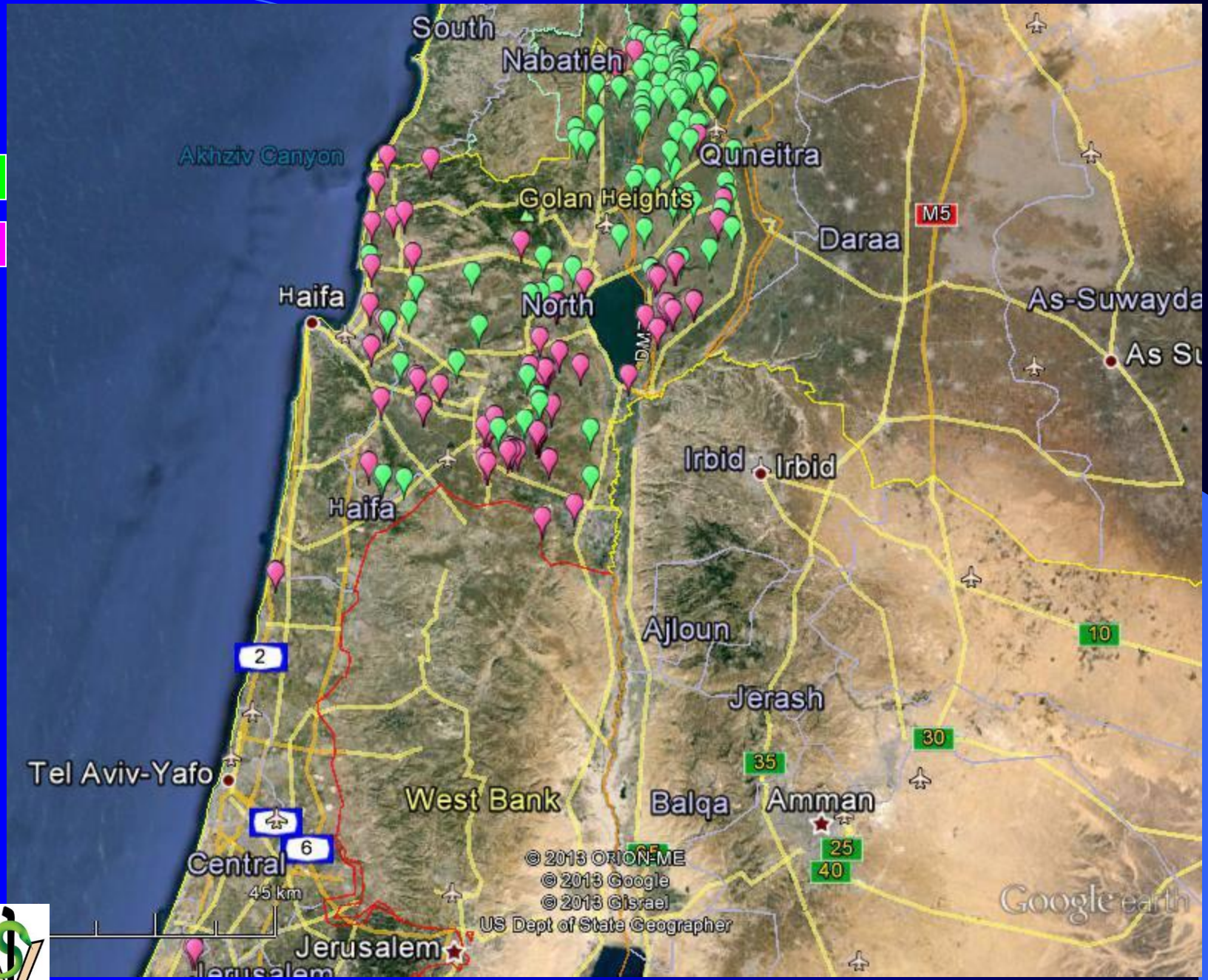
Milk





Beef

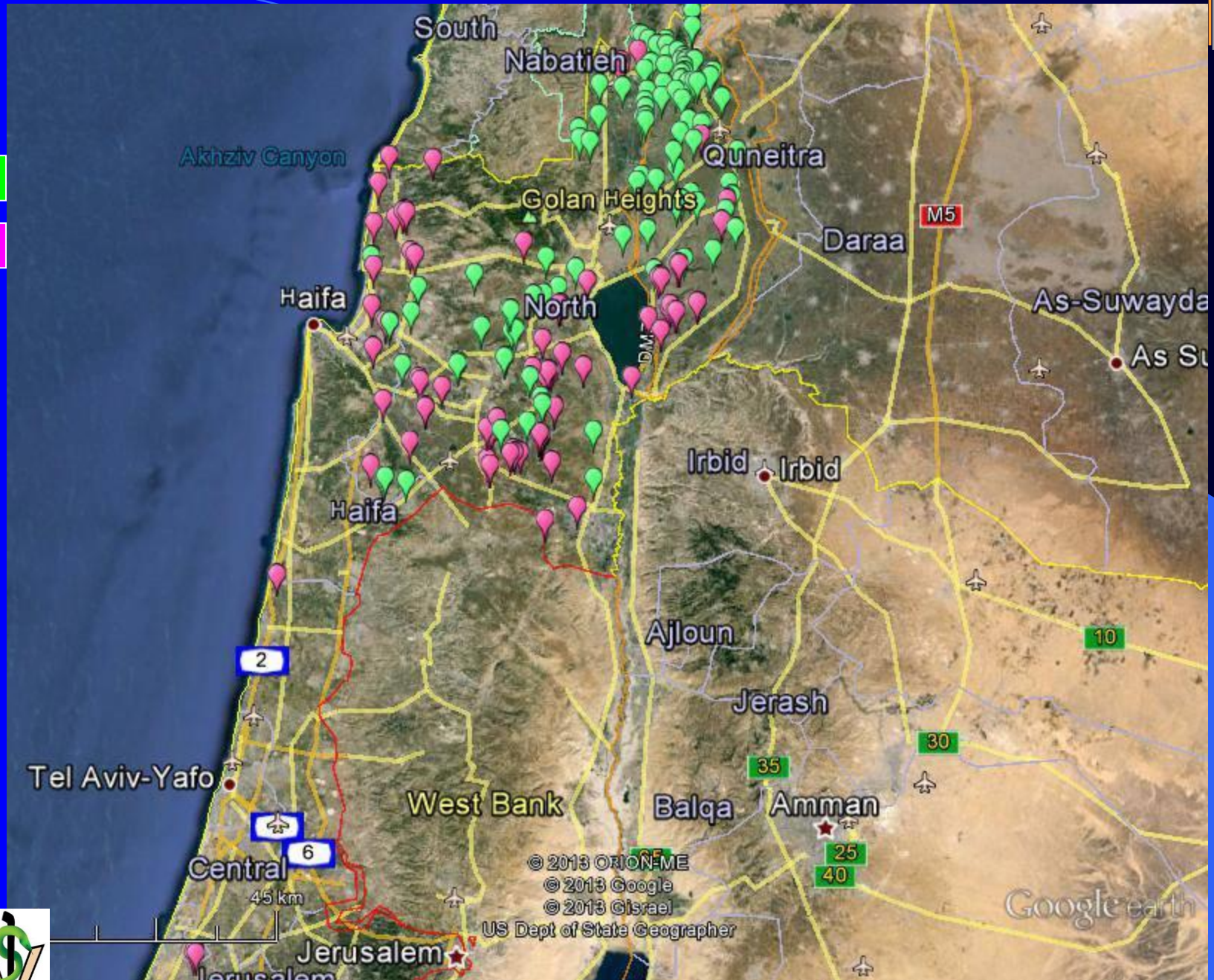
Milk





Beef

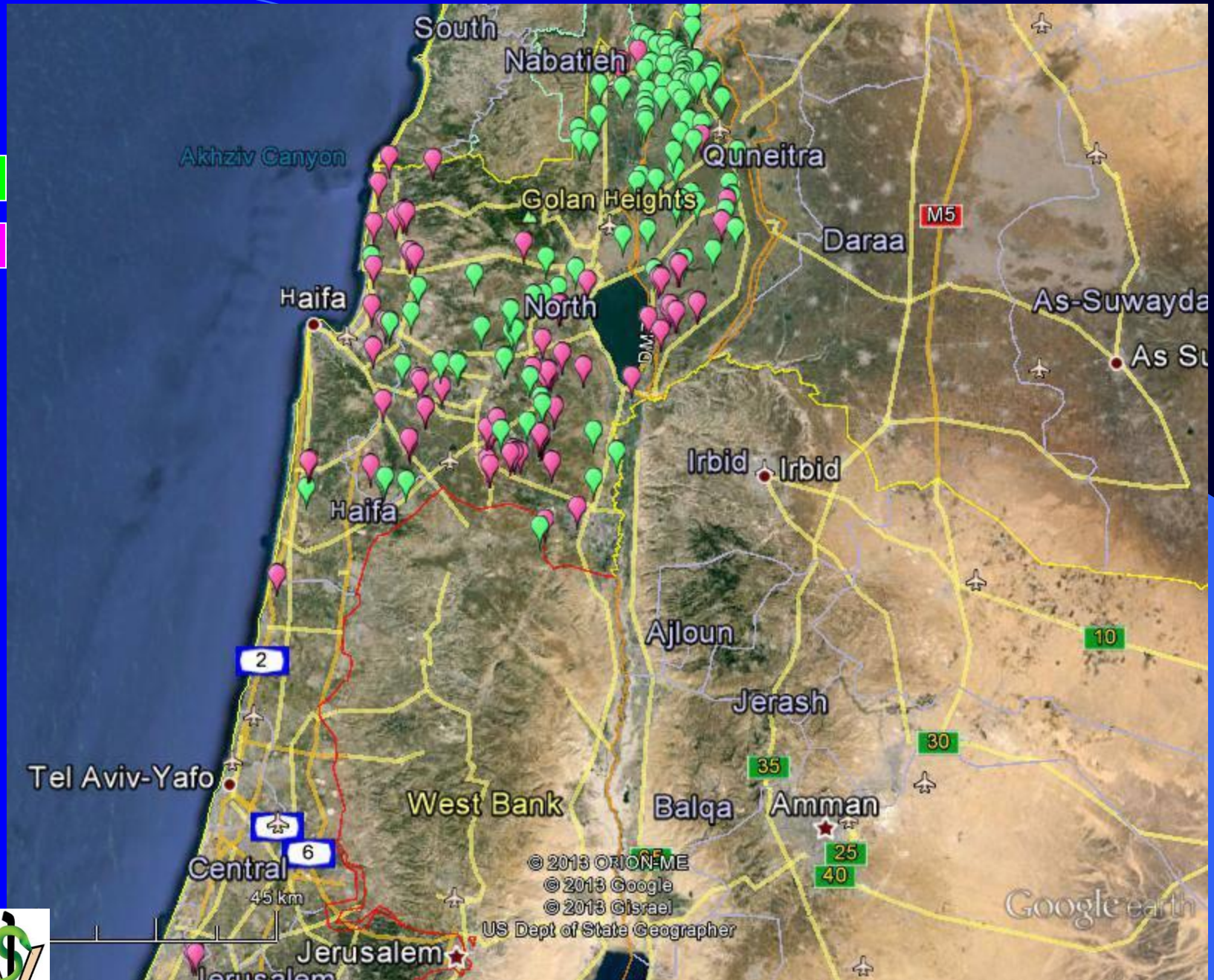
Milk





Beef

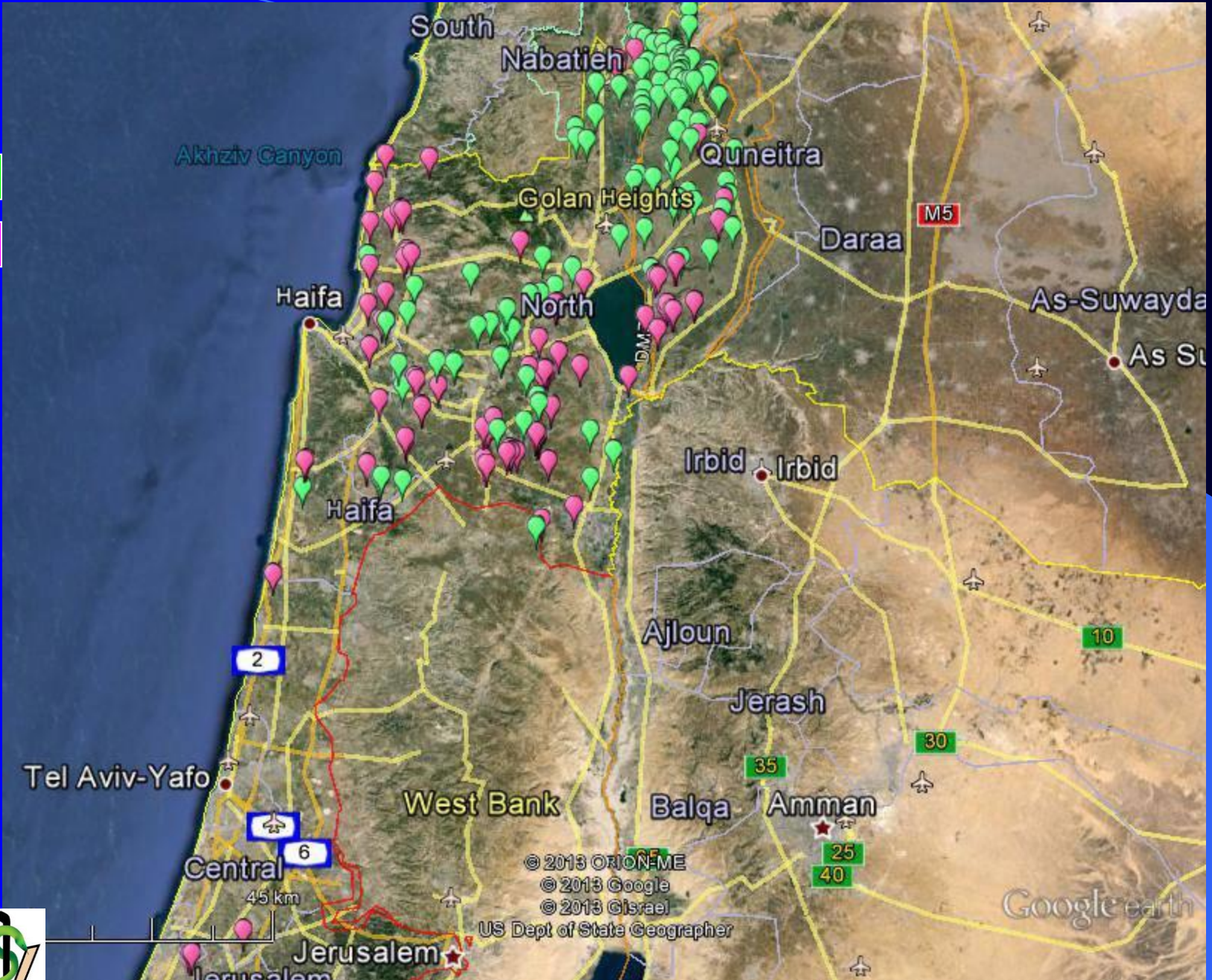
Milk





Beef

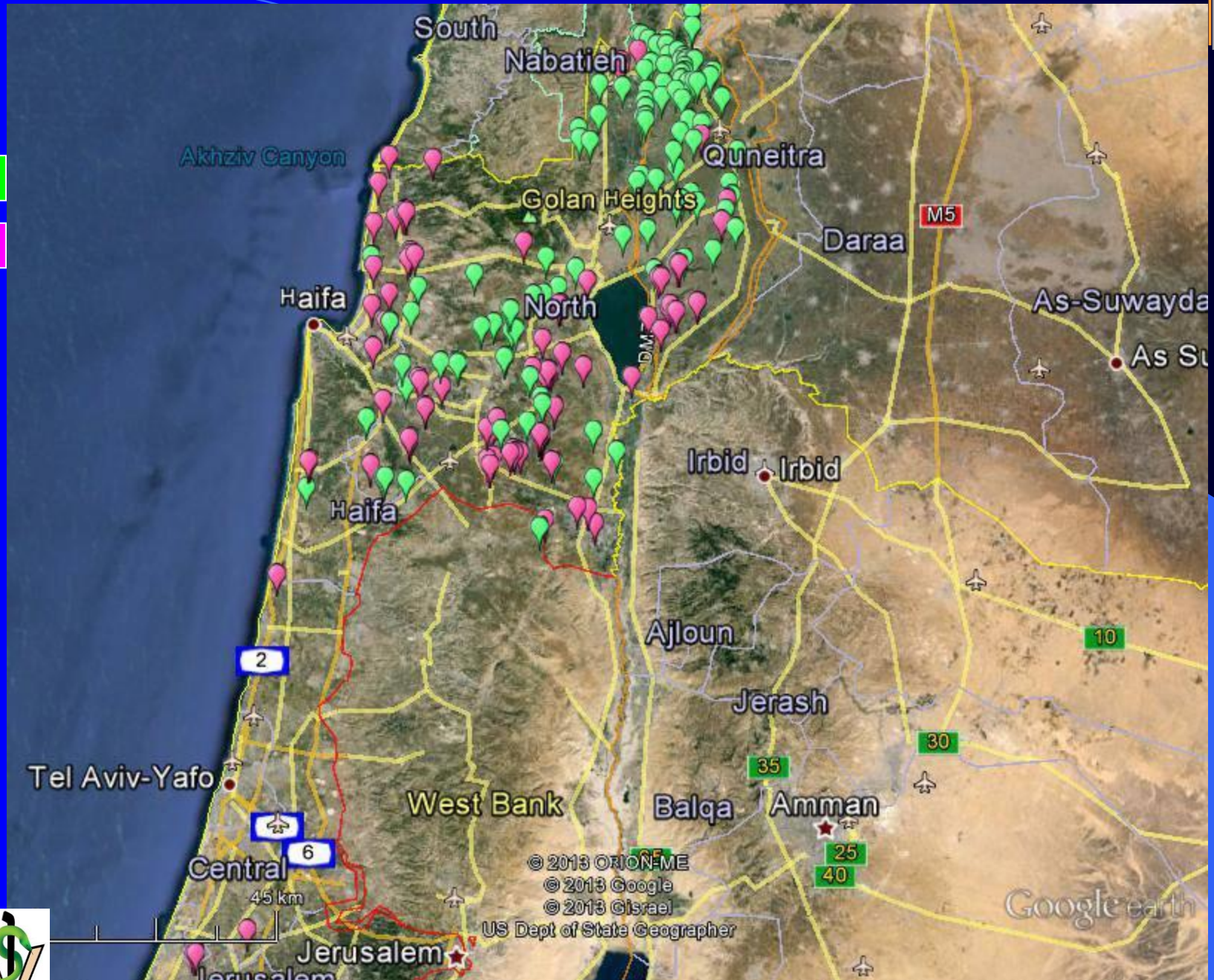
Milk





Beef

Milk



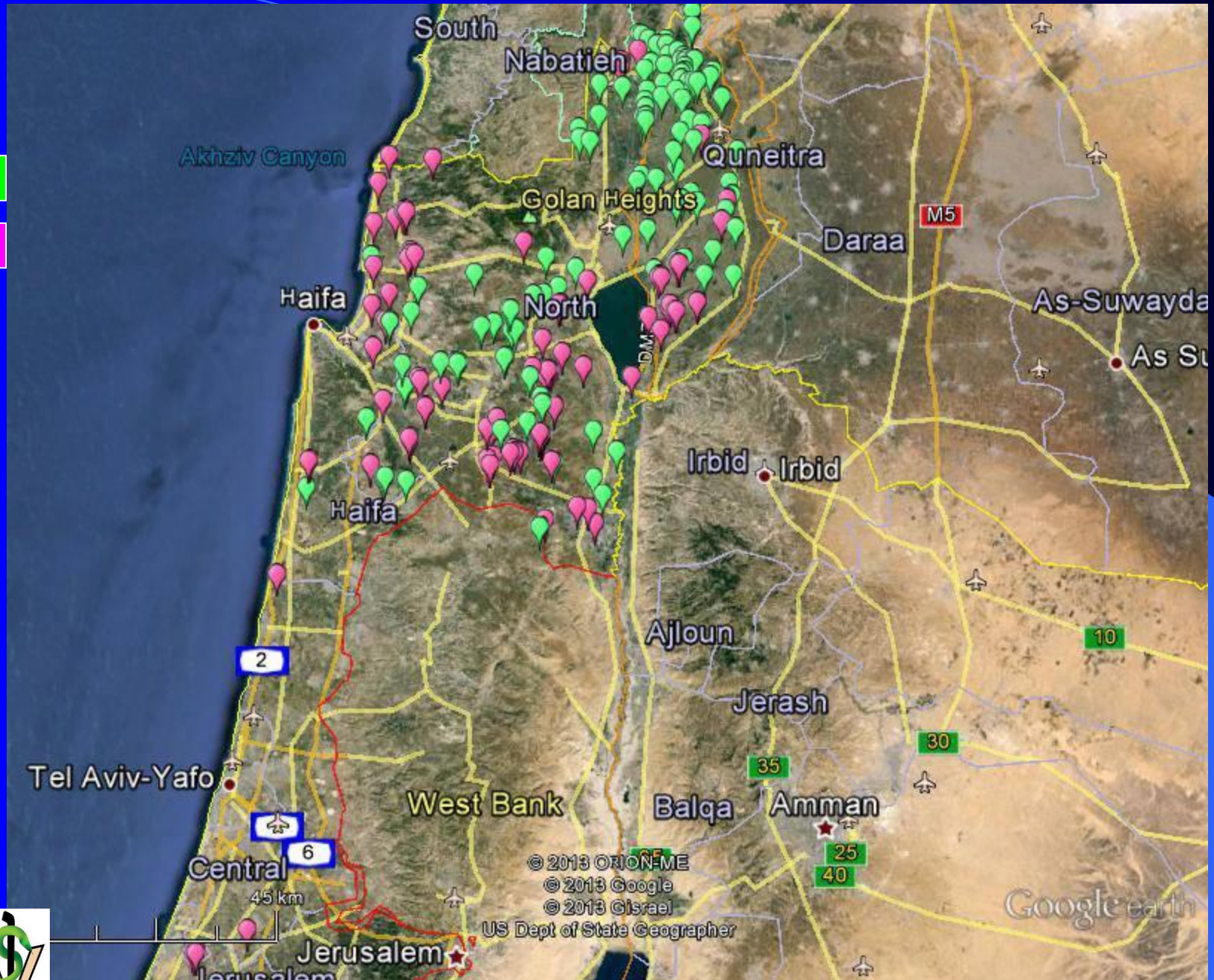
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 US Dept of State Geographer

Google earth



Beef

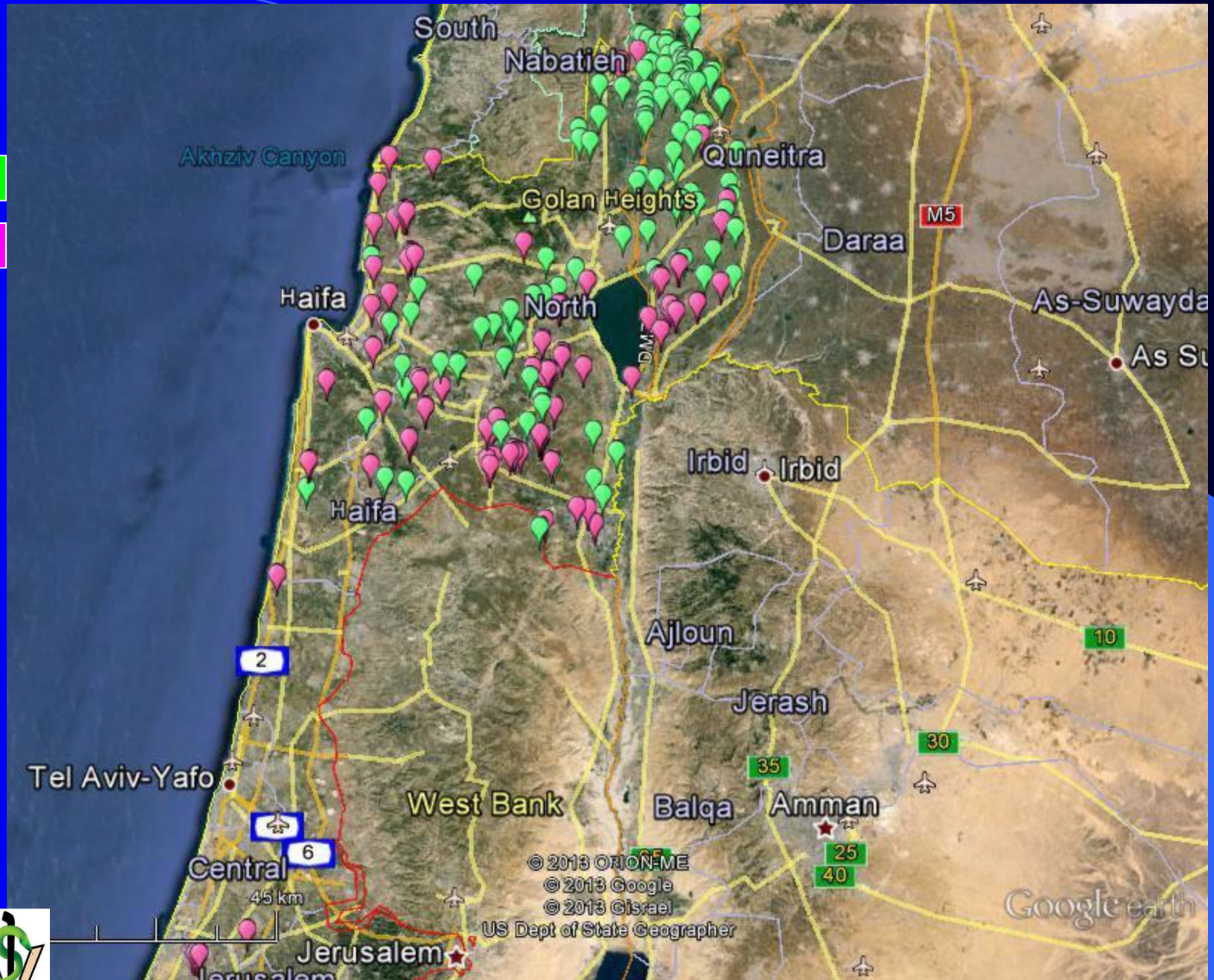
Milk





Beef

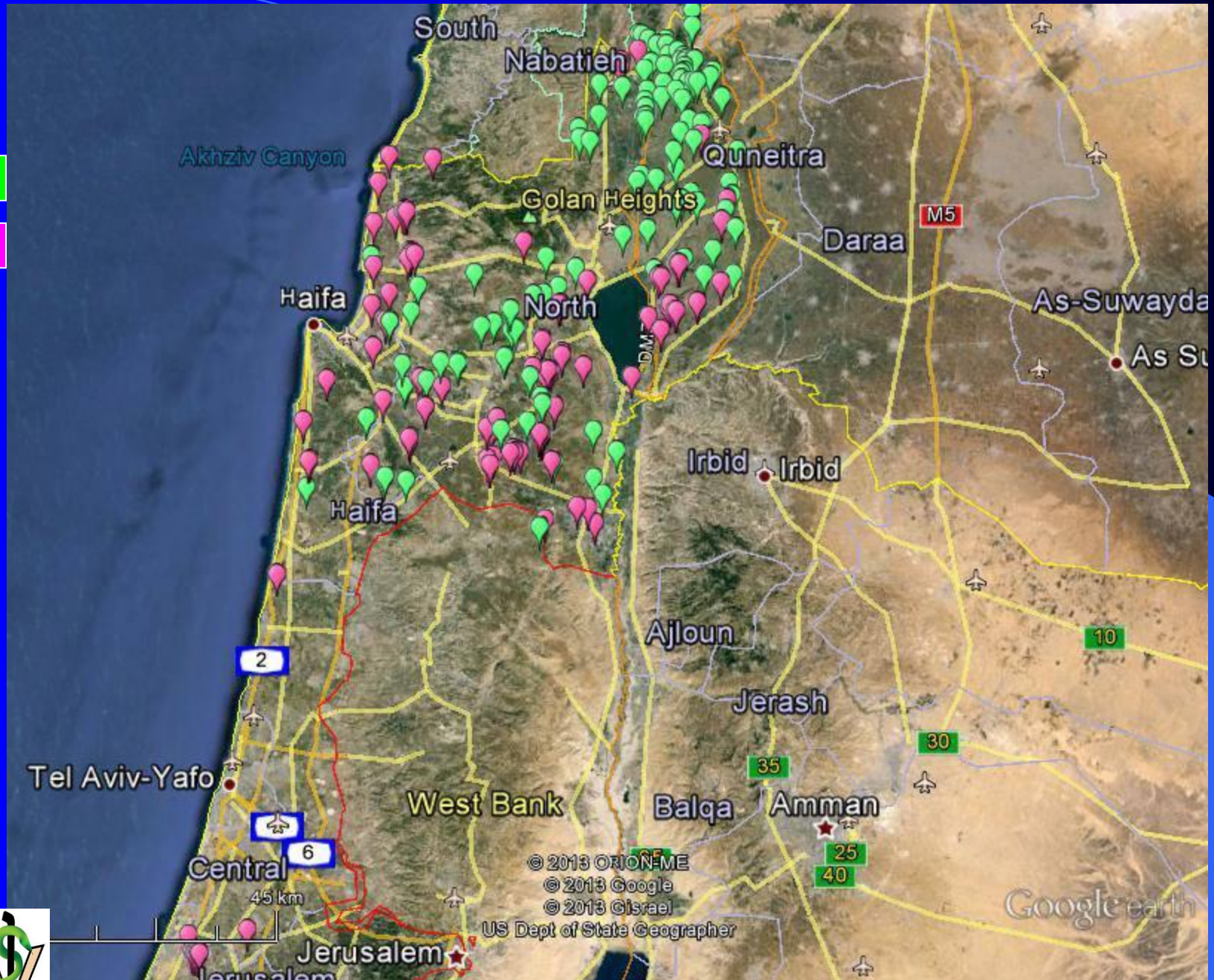
Milk





Beef

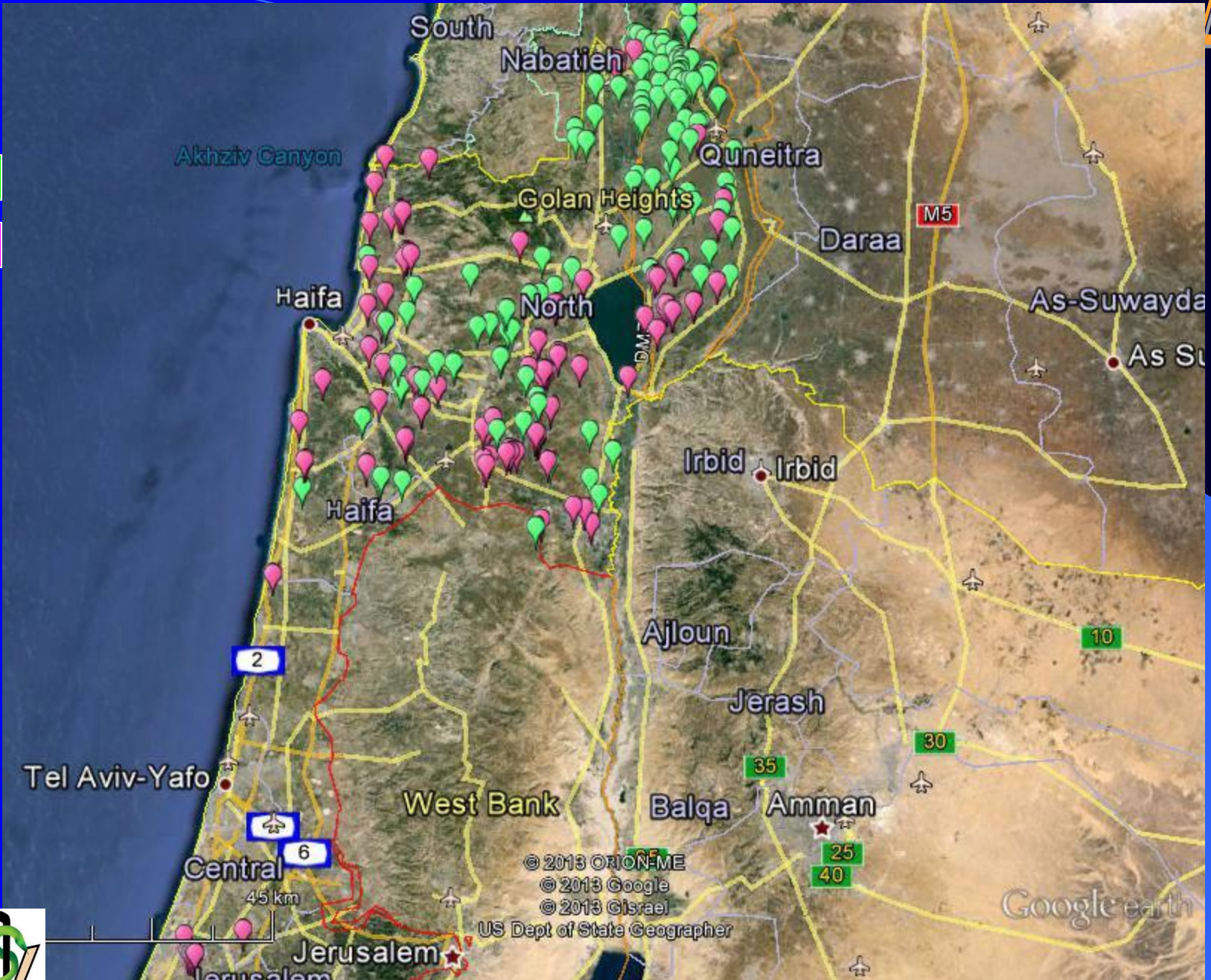
Milk





Beef

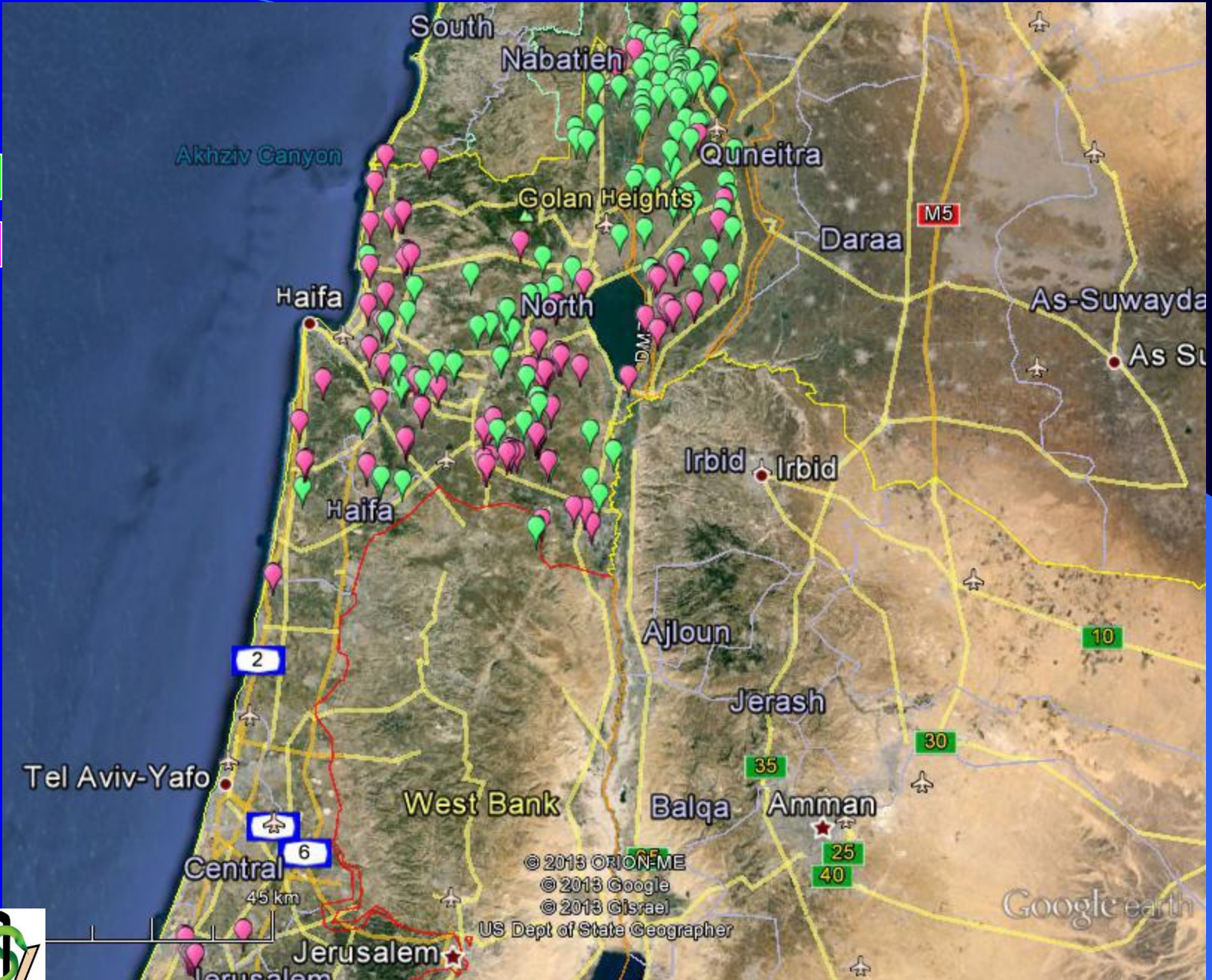
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Beef

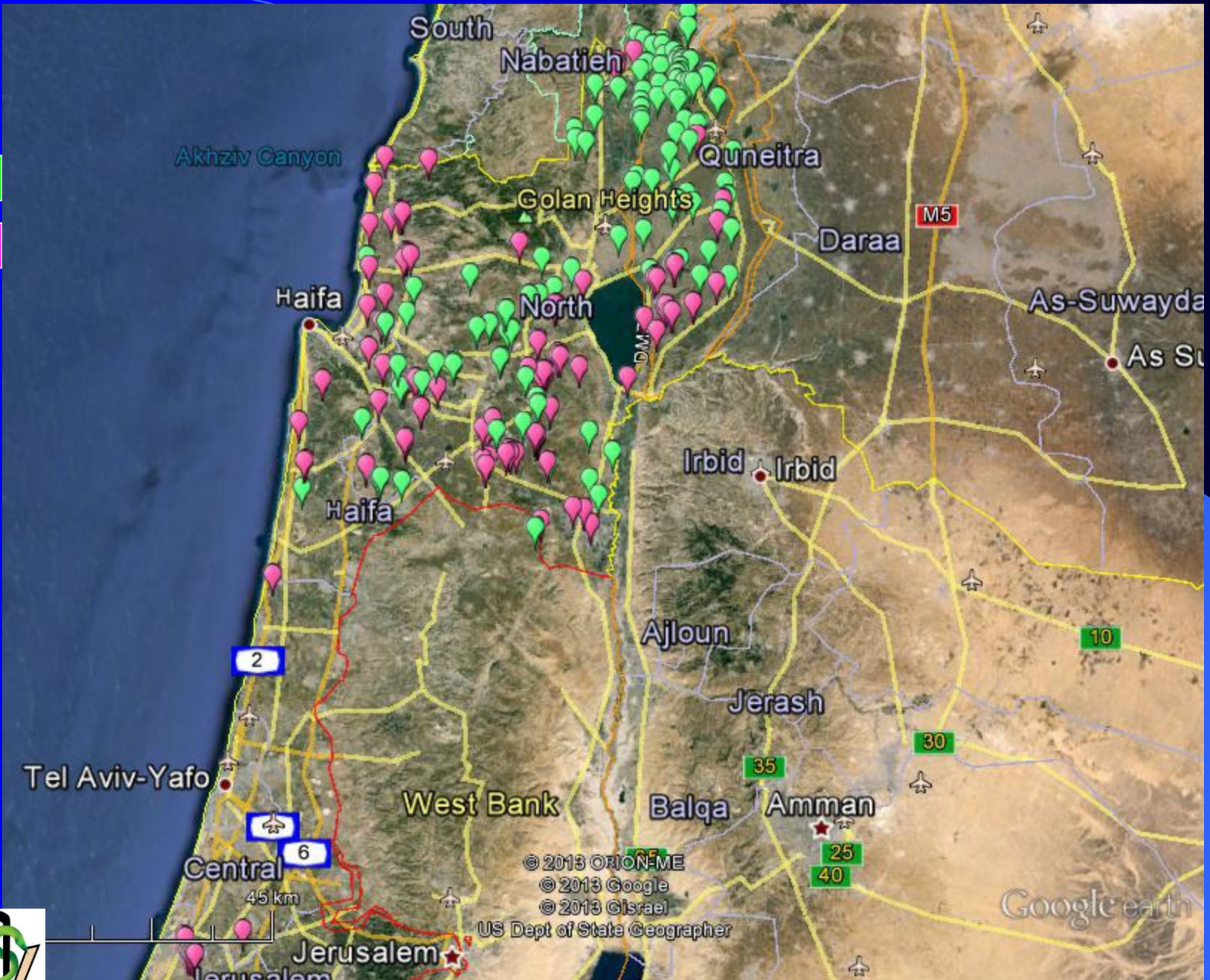
Milk





Beef

Milk







How can drones assist in LSD surveillance and prevention?

Mostly remote herds



# Finding affected herds/animals with a drone





# Advantages: Possibility of scanning large areas in short time





# Advantages:

Possibility to find and reach remote/hidden herds in open fields





# Advantages:

## Finding animals in high vegetation





# Advantages: Overcoming obstacles

**Water/fire**





Advantages:  
Overcoming  
obstacles



Impassable areas



# Advantages:

## Overcoming obstacles

## Dense vegetation



# Advantages: Overcoming obstacles

## Mine fields





# Advantages:

Counting animals in herds including morbidity/mortality

Census or surveillance to be sure no animals “escaped” quarantine





# Advantages:

Tracking animals in movement

Surveillance in area with large number of farms

Surveillance in areas where the cooperation is missing





# Advantages:

## Safety and welfare of the staff

- Physical difficulties to reach the herd
- Hot/cold weather/snow
- Dust and air pollution





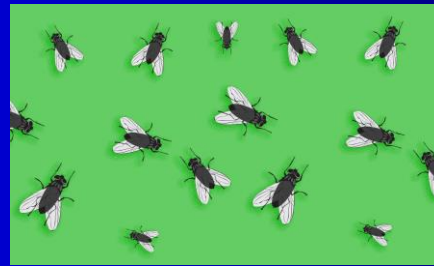
# Advantages:

## Safety and welfare of the staff

- Animal aggressions



- Arthropods



- Snakes and other dangers in the field

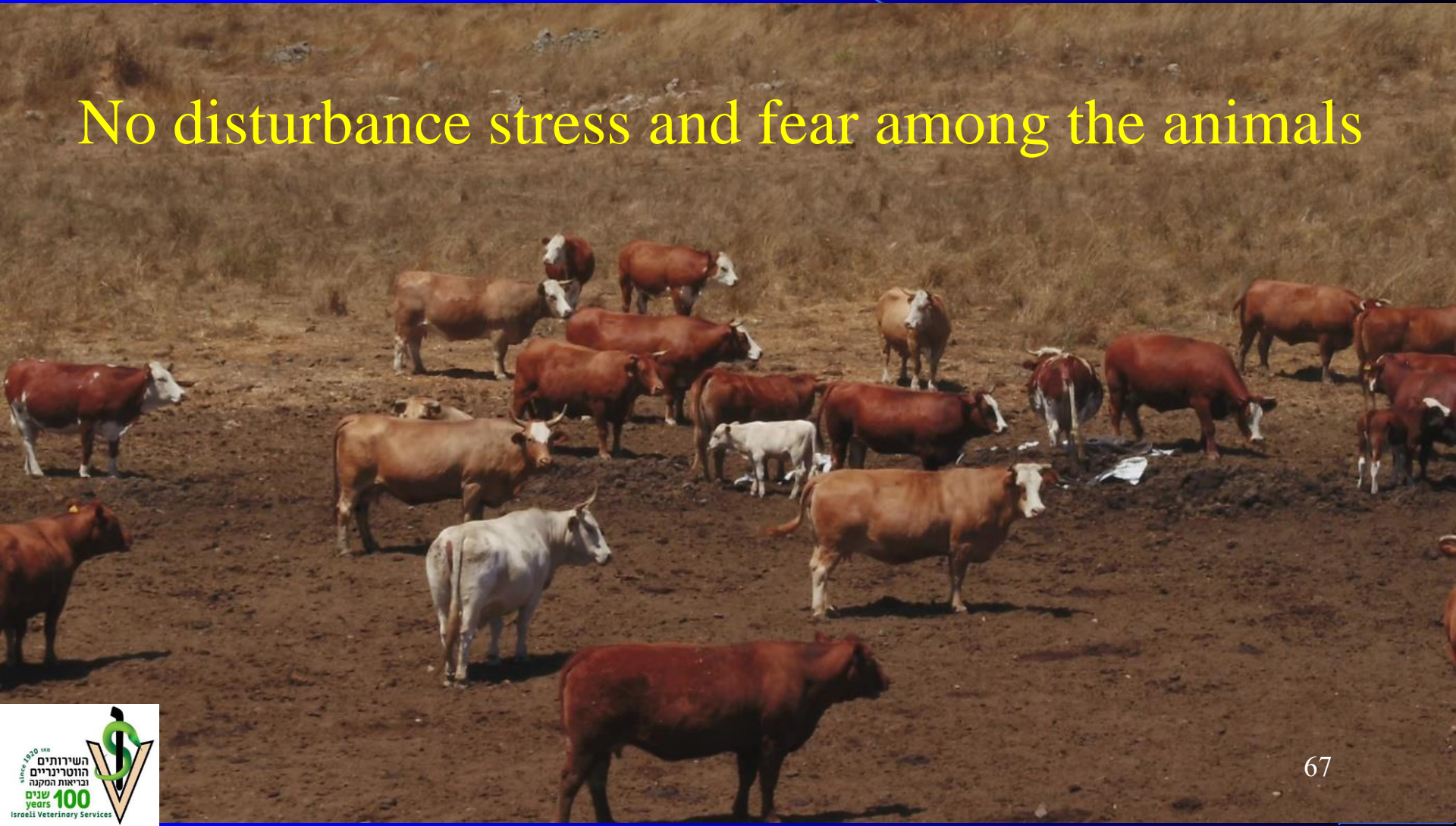


Mines



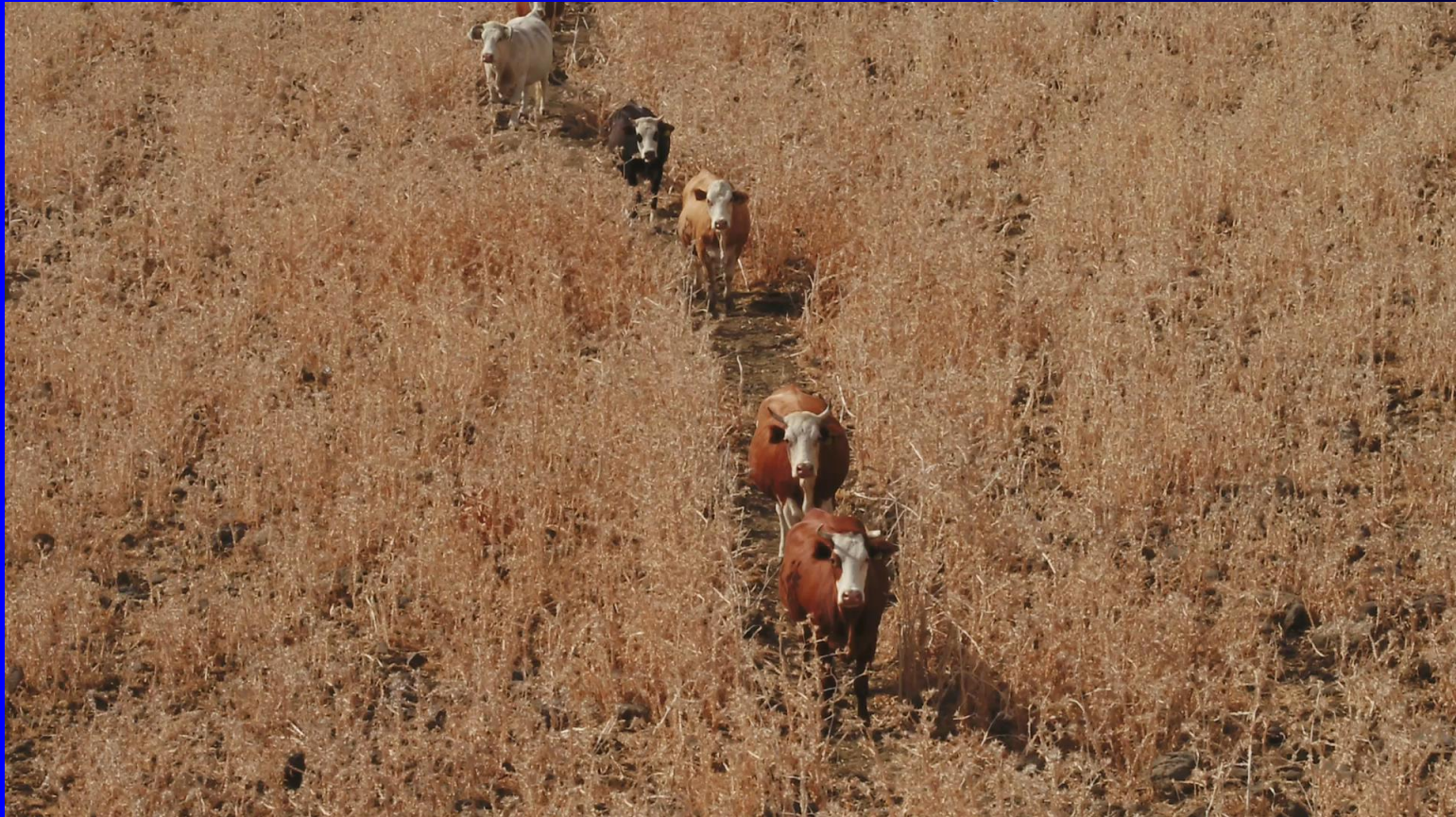
# Advantages:

No disturbance stress and fear among the animals





# Observing the drone at first





# Advantages:

Possibility to spot affected animals





# Diagnostic of LSD





# Diagnostic of LSD – close up









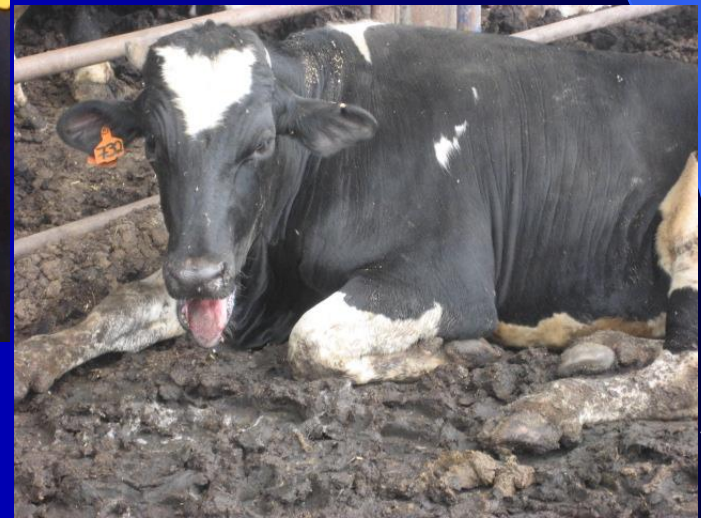
# Advantages:

Possibility to identify the animals by their numbers





# Advantages: Biological safety (FMD)





# Advantages:



High quality documentation by photos and videos





# Disadvantages:

- Exceptional weather conditions
- Short time of battery



- Price



- License



- Permits in some areas (army etc.)



## Skilled operators





# Staff in activity Not just cattle





# Eye lesions





# Epizootic hemorrhagic disease





# FMD

## Including healing





# Peste des petits ruminants/pox







# Animals in war zone

Welfare and location of wounded animals  
Avoiding hazardous substances





# Acknowledgements

- ❖ Ezra Rozenblutt
- ❖ Boris Even Tov and his staff from Galil-Golan District
- ❖ Farmers who cooperated
- ❖ Animals

**No Animals, Aircrafts  
or Veterinarians were  
hurt in the production of  
these films ☺**





Thank you for listening





# Other ideas?

- ❖ Poisonings
- ❖ Following rabid animals
- ❖ Thermic camera