

A close-up photograph of a person's hand feeding a brown cow with green grass. The cow is looking towards the camera. In the background, other cows are visible in a grassy field.

# Feeding Livestock

Glen K. Fukumoto  
University of Hawaii at Mānoa  
Palau Livestock Management Academy  
March 21-25, 2011

# Outline

- Nutrients
- Nutrient components in feeds
- Nutrient requirements at various stages of growth and production
- Feeds
- Pearson's Square

# Nutrients

- Fresh Water
- Energy
- Protein
- Vitamins
- Minerals

# Fresh Water

- Required for:
  - Temperature regulation
  - Nutrient and Waste transport
  - Metabolic processes
  - Lubrication
  - Milk production
- Lost from body through: skin, lungs, intestines, kidneys

# Energy

- Required for:
  - Maintenance
  - Growth
- Energy fractions:
  - Carbohydrates
    - soluble (starch, sugar),
    - insoluble (fiber)
  - Fats & Oils

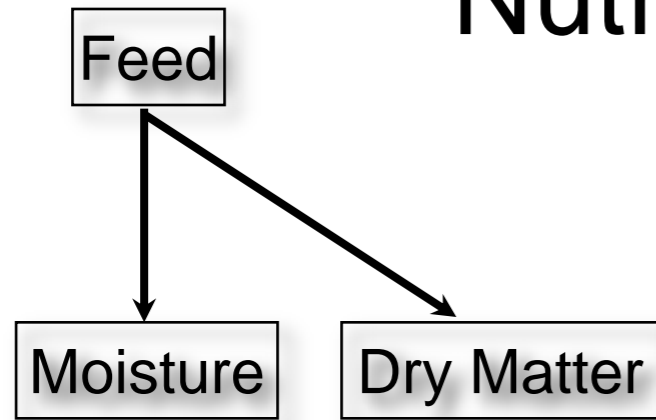
# Protein

- Required for:
  - Maintenance
  - Growth (muscle mass)
  - Lactation
- High protein feeds include:
  - beans, legumes, meat & fish products

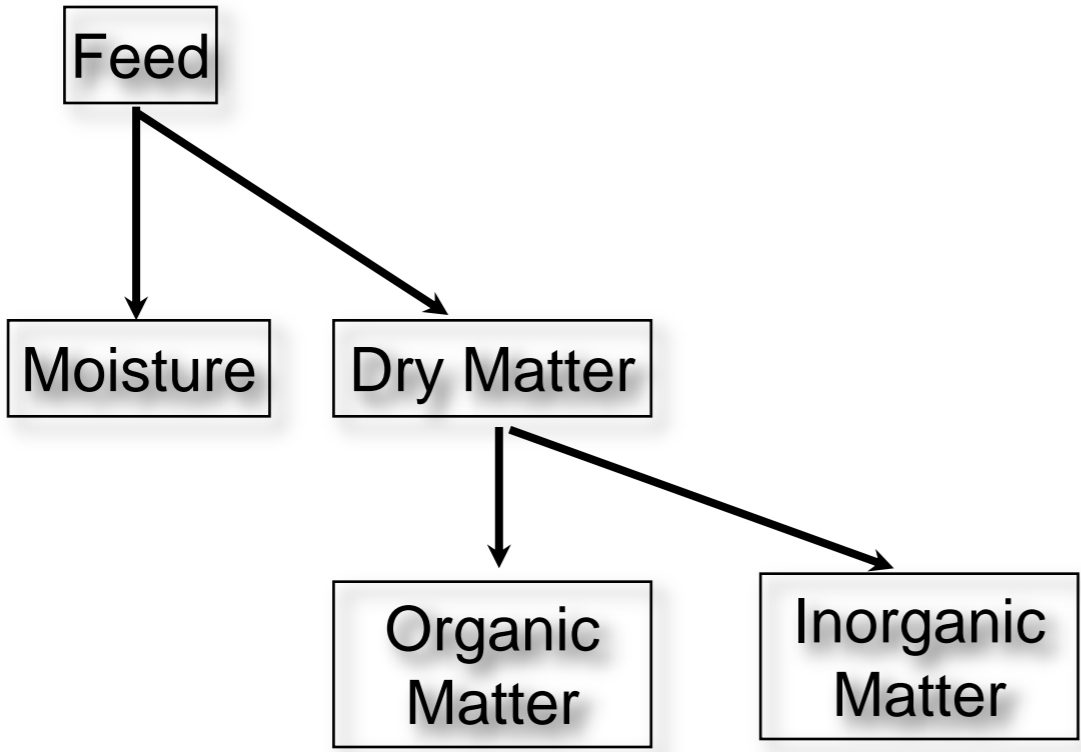
# Vitamins & Minerals

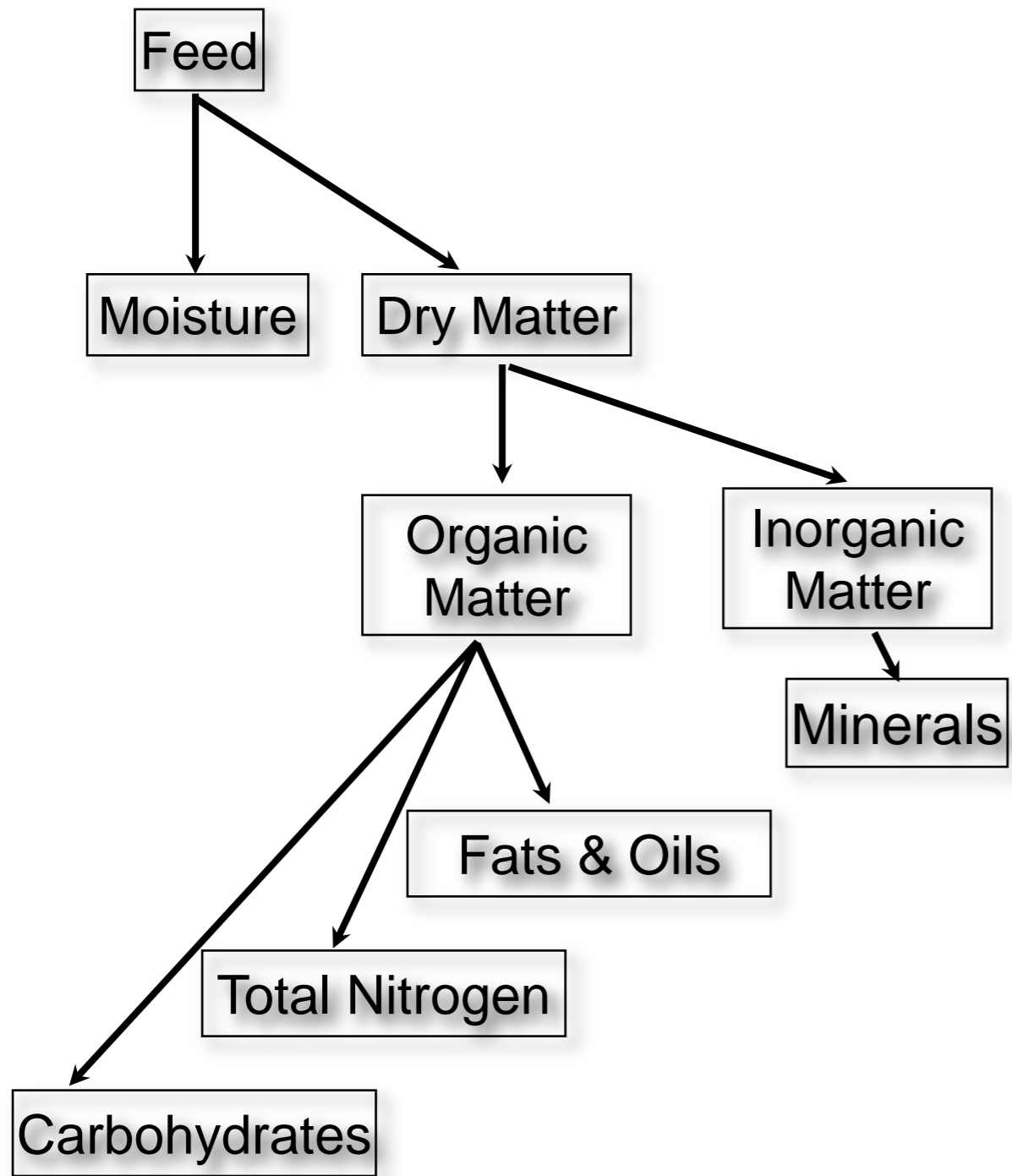
- Required for many diverse functions in the body.
- Vitamins
  - organic compounds
  - Fat soluble - A, D, E, K
  - Water Soluble - B <sup>(9)</sup>, C
- Minerals
  - inorganic compounds
  - Macro - Ca, P, K, Na, Cl, Mg, S
  - Micro - Zn, Mn, Se, Co, Cu, I, Fe

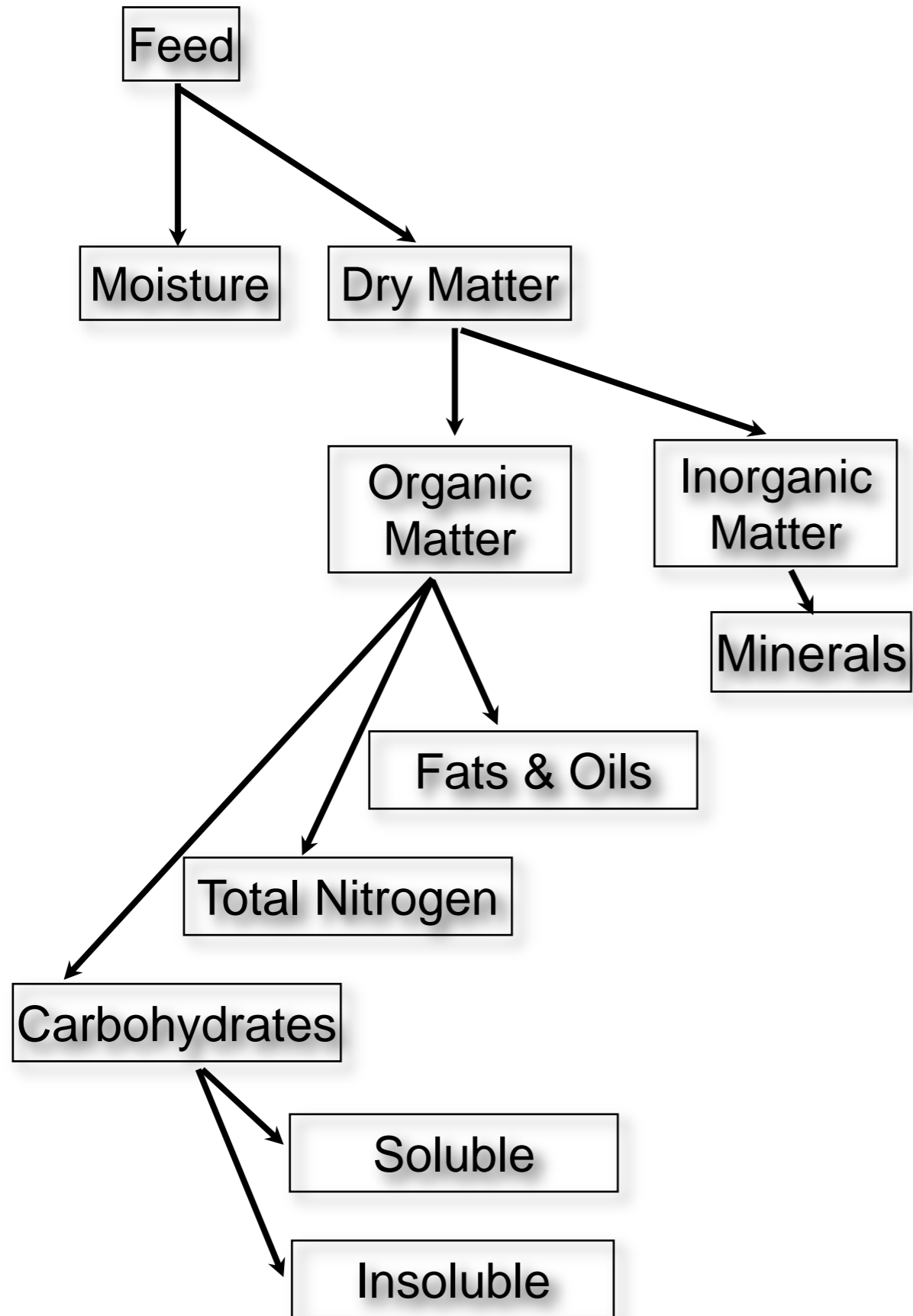
# Nutrient Components in Feed

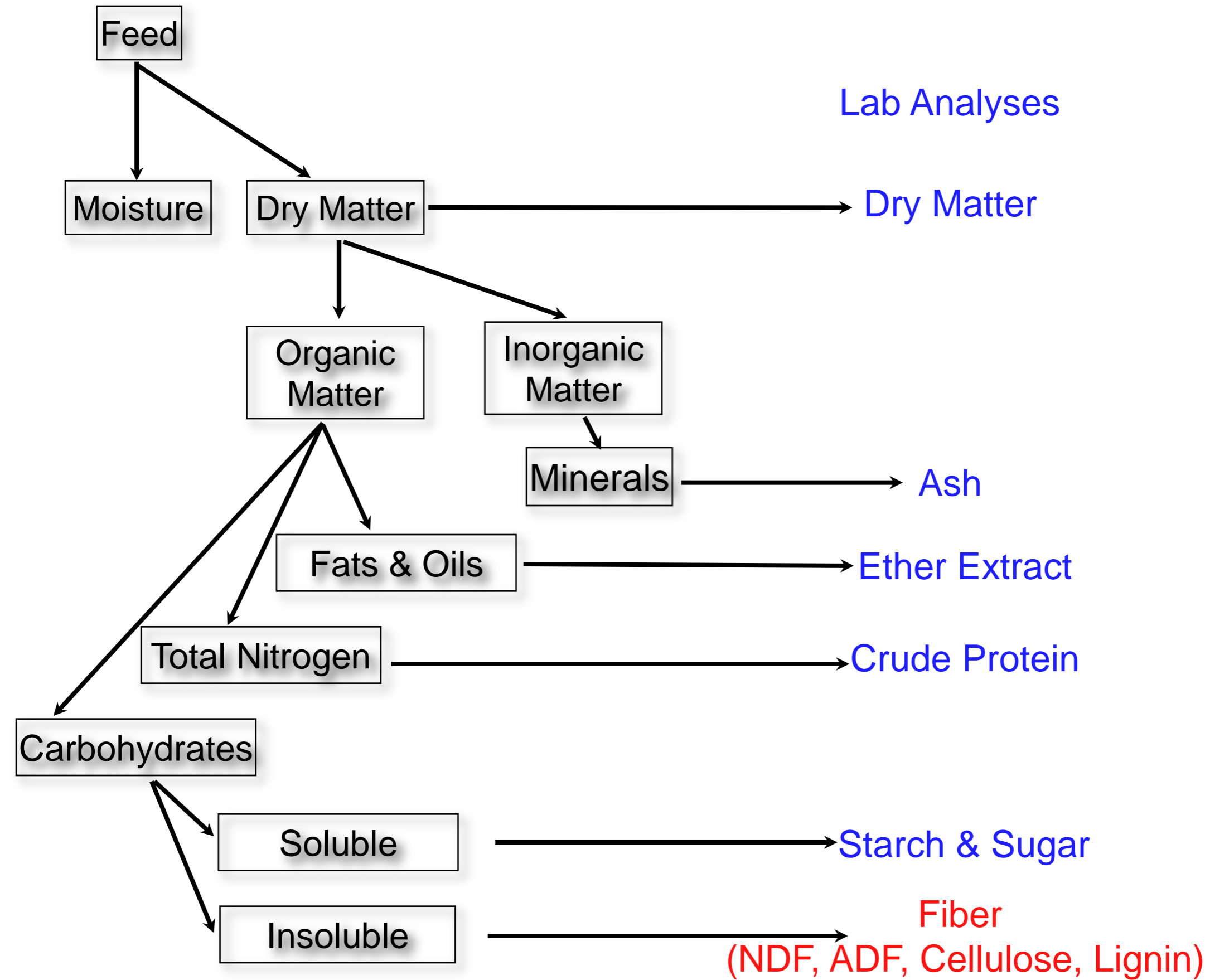










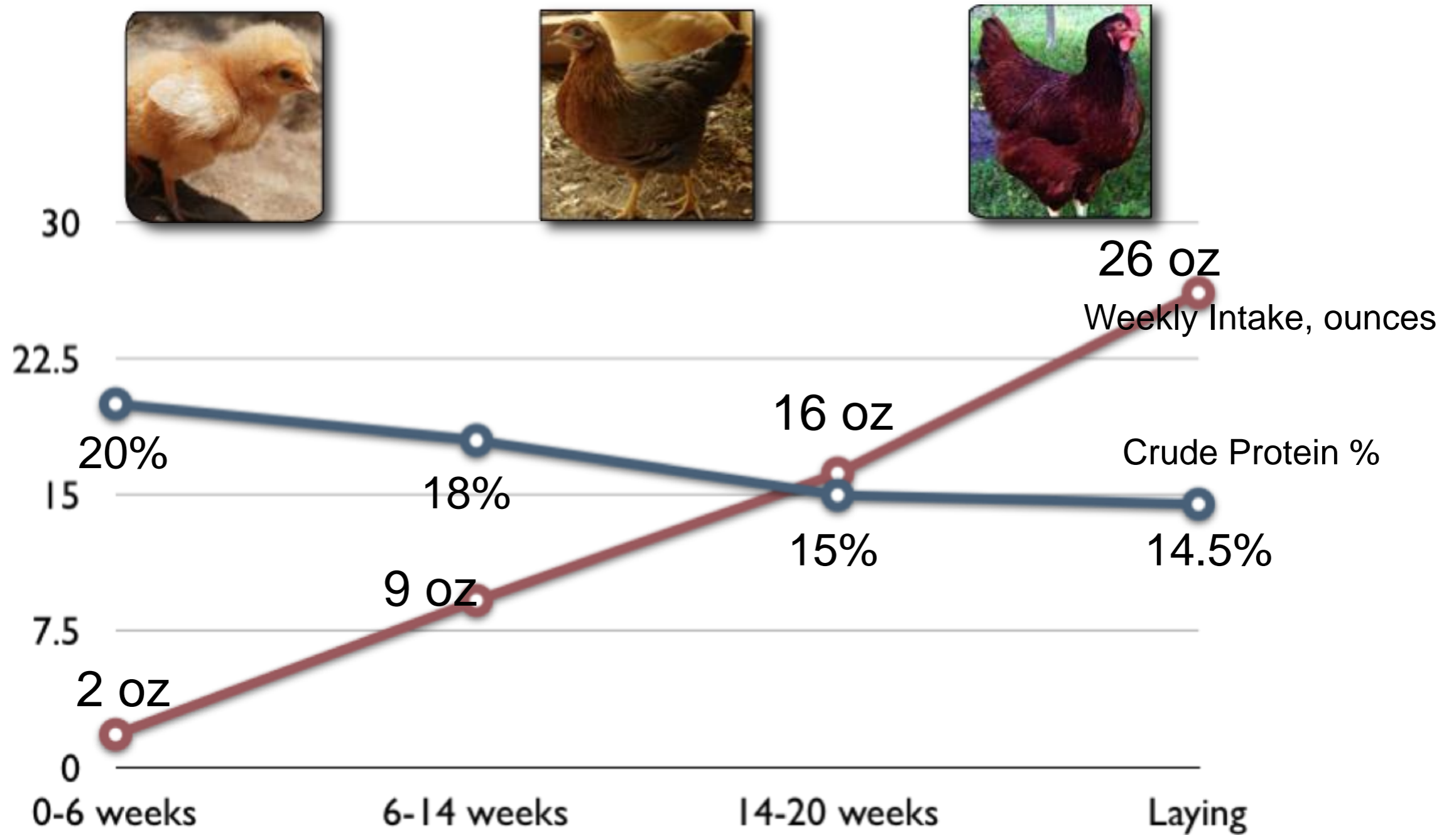


# Animal Nutrient Requirements

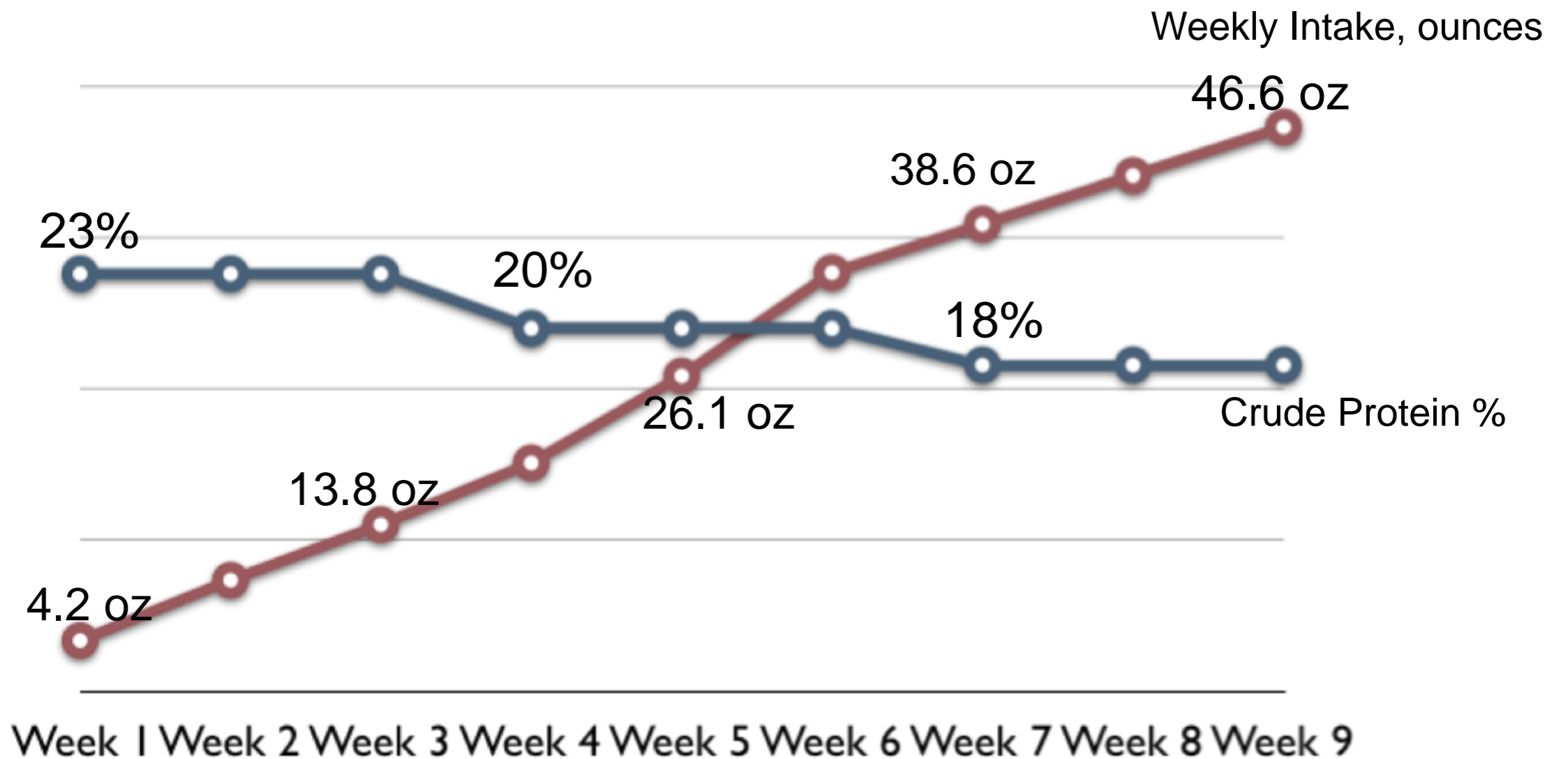
... varies with stage of growth

- Young, post wean
- Growing stage
- Finishing stage
- Breeding Stock
- Lactation

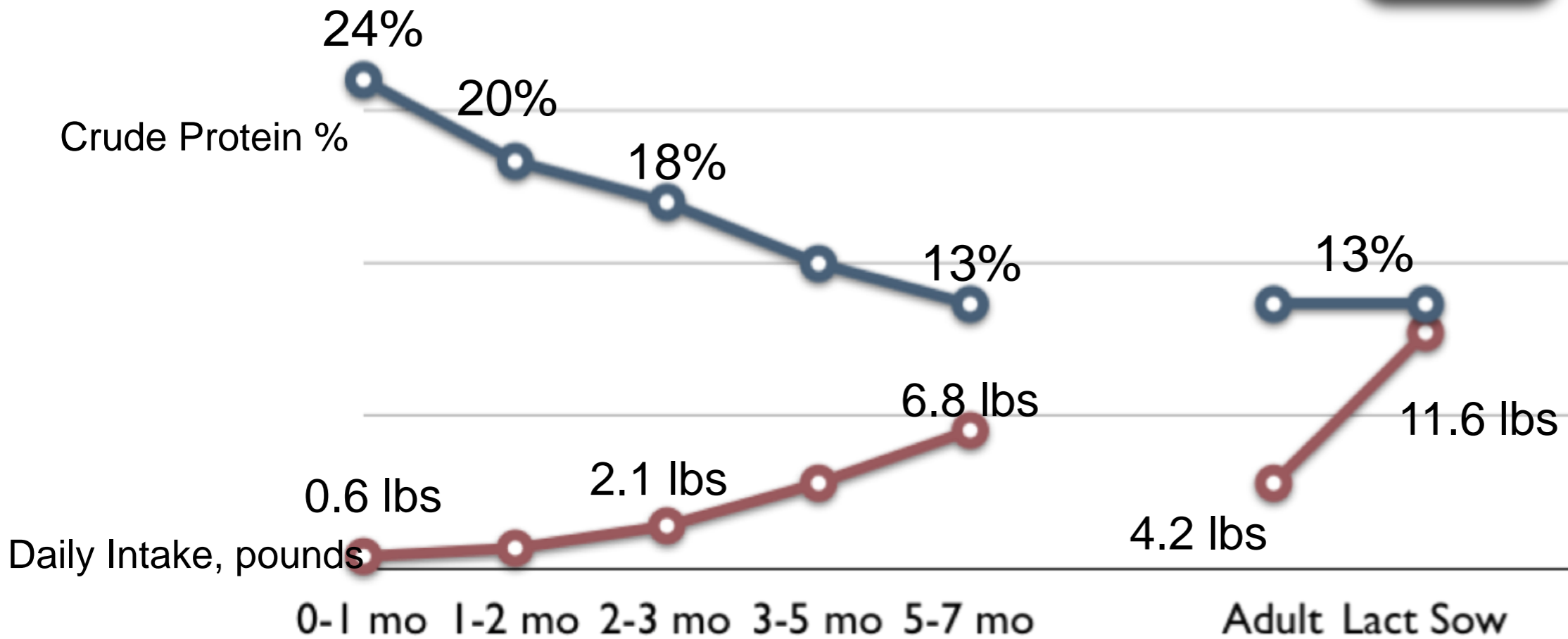
# Laying Hens



# Meat Birds, Broilers

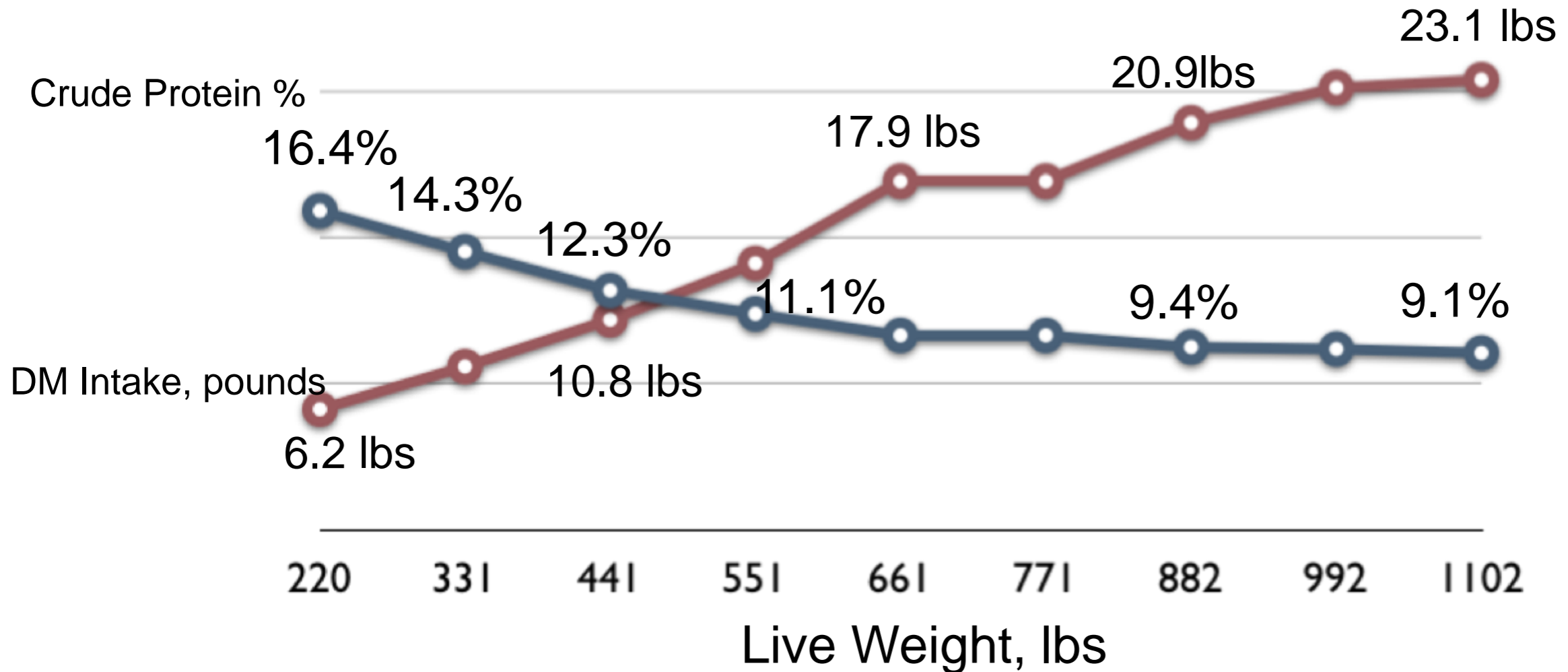


# Pork Production





# Beef Production



# Typical feedstocks

Feedstock	Dry Matter, %	Energy kcal/kg	Crude Protein, %	EE, %
Corn	88	3,530	8.5	3.6
Soy BM	90	3,490	44.0	1.1
Meat & Bone Meal	94	2,540	51	9.7
Alfalfa	92	1,880	17.4	2.8

# Tropical Feedstuffs, Reference, FAO, 1991

Feedstock	Dry Matter, %	Energy kcal/kg	Crude Protein, %	EE, %
Banana stem	6-25	Low carb	2.8	1.2
Banana fruit	74	2,693	4.0	0.8
Food waste	43.2	-	10.3	7.2
Cassava root	33	Hi carb	2.6	1.0
Coconut	24.1	Hi fat	6.9	38.1
Sweet potato	29.2	Hi carb	4.4	0.6

# Grubs, Maggots, Worms



Bio-Pod

Soldier fly larvae  
40-42% CP  
34-35% fat



Ke kmal mesulang

