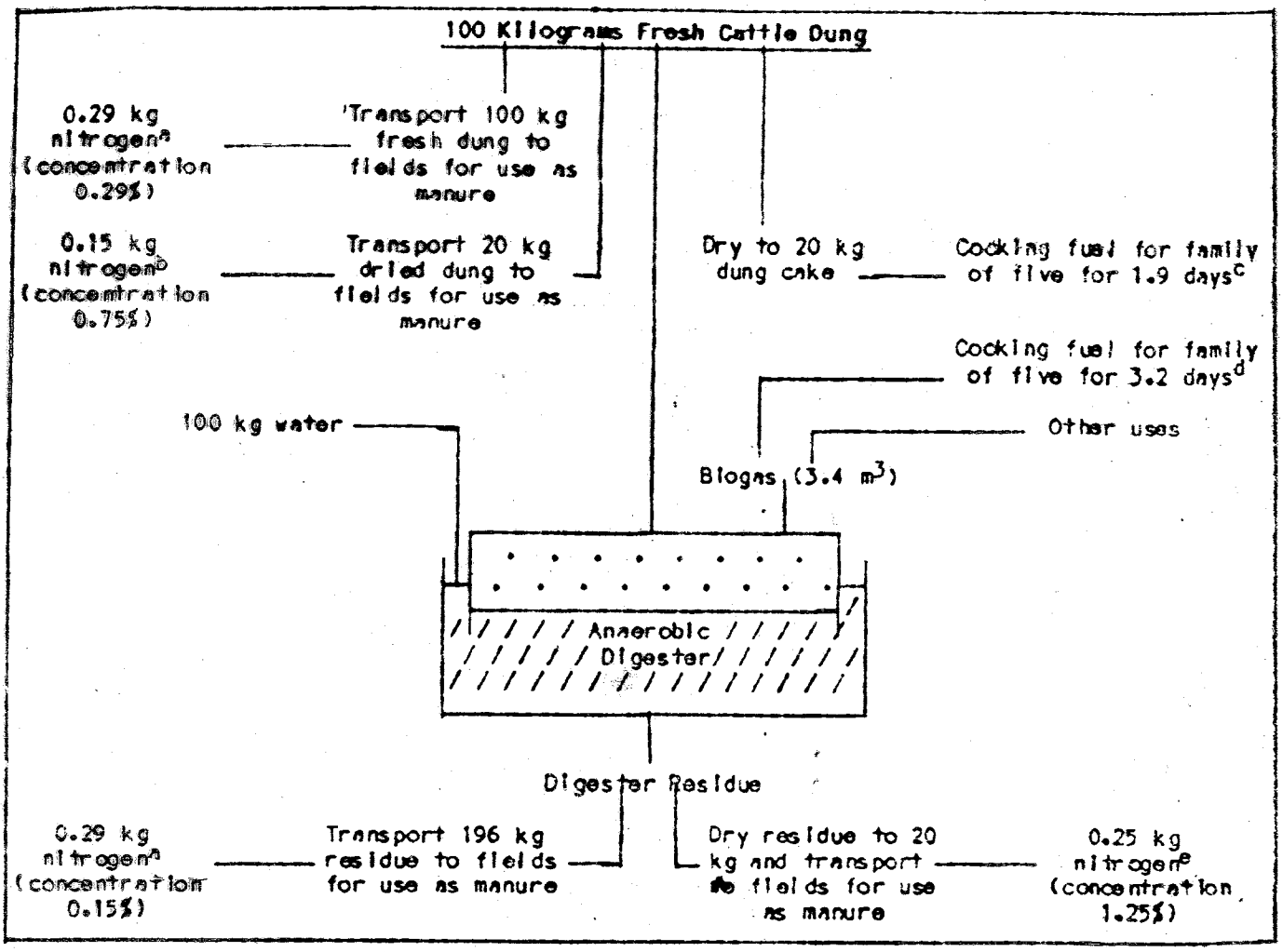
VII.1 Some Alternative Options for Utilization of 100 Kilograms of Fresh Cattle Dung. Values are approximations based on best available information. (After Santerre and Smith, 1980; Rajabapaiah et al., 1979; Bhatia and Niamir, 1979.)



a Assumes nitrogen content of 0.29 kg and no losses between digester and field.

b Assumes nitrogen decreases by storing in open air from 1.7% to 0.9% of total solids. (Note: Change in solids concentration with storage time is not given.)

c
1. Assumes the daily per capita energy requirments for cooking = 578 kilocalories (kcal) of useful energy.
2. Assumes dung cakes thermal value = 2,444 kcal per kg which are used at 11.2% efficiency for cooking, having a useful energy content of 273.7 kcal per kg.
3. Household daily dung requirements for cooking:

$$\frac{(578 \text{ kcal/capita})(5 \text{ persons})}{273.7 \text{ kcal/kg}} = 10.6 \text{ kg dung cakes}$$

4. At assumed manufacturing rate of 20 kg dung cakes per 100 kg fresh dung, 10.6 kg dung cakes = 53 kg fresh dung required by family of 5 per day. 100 kg fresh dung thus provides for 1.9 days of cooking fuel.

d
1. Assumes energy content of biogas = 4,500 kcal per m^3, which is used at 60% efficiency by biogas stove (Srinivasan, 1978), and has a useful energy content of 2,700 kcal/m^3.
2. Household daily biogas requirement for cooking:

$$\frac{(578 \text{ kcal/capita})(5 \text{ persons})}{2,700 \text{ kcal/m}^3} = 1.1 \text{ m}^3 \text{ biogas}$$

3. Assuming conversion rate of 28.2 kg fresh dung into one m^3 biogas, then daily household requirement for dung = 1.1 m^3 x 28.2 kg = 31 kg fresh dung. 100 kg fresh dung thus provides for 3.2 days of cooking fuel.

e Assumes nitrogen decreases by storing in open air from 2.2% to 1.9% of total solids. (Note: Change in solids concentration with storage time not given.)