

Land use and the food-fuel conflict in Africa

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BIOFUELS

- Displace rural poor
- Deny poor access to natural resources
- Destroy biodiversity
- Displace food & cash crops
- Deplete/pollute water resources
- etc, etc



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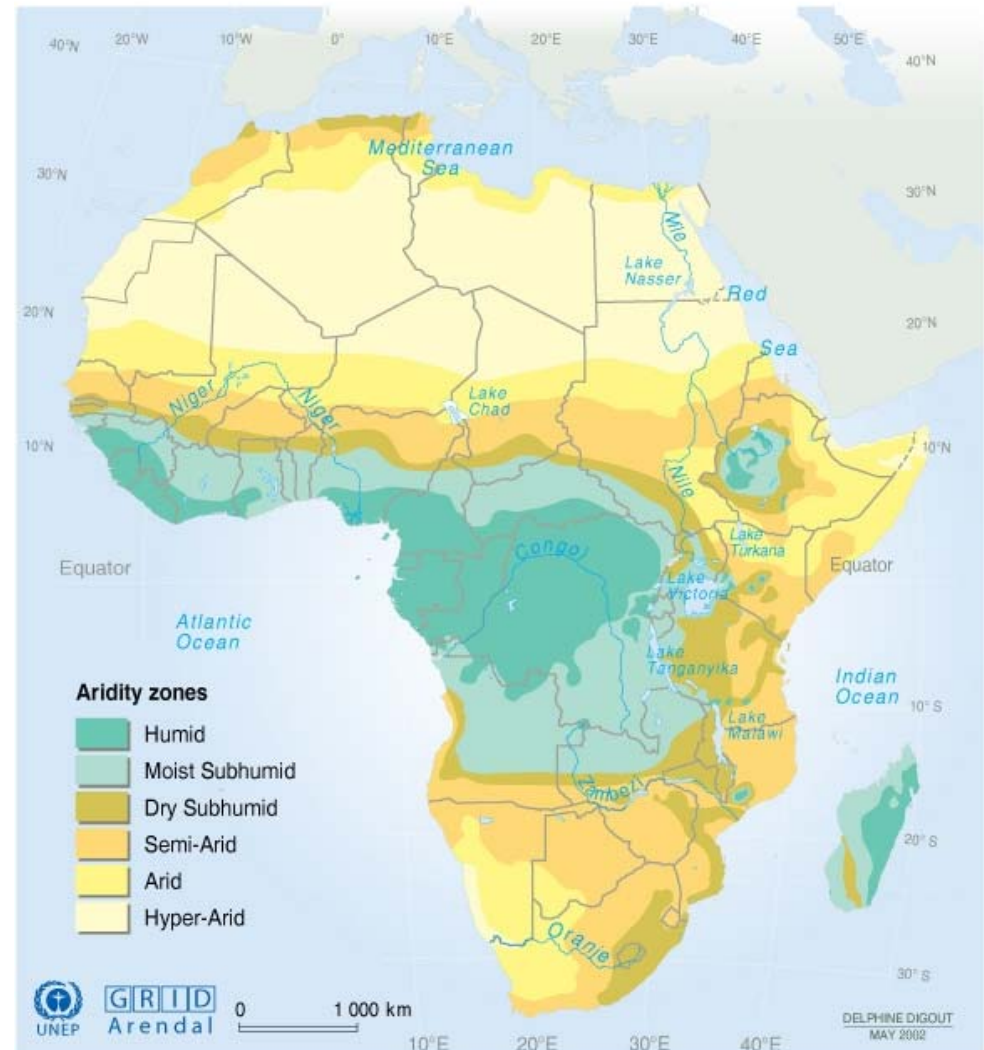
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BIOFUELS

Aridity Zones

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Source: World Meteorological Organization (WMO), United Nations Environment Programme (UNEP), *Climate Change 2001: Impacts, Adaptation, and Vulnerability*, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).







Ranidhera village, India







Rehabilitating degraded lands



Government schemes or subsidized or tax incentives



Garalo village, Mali

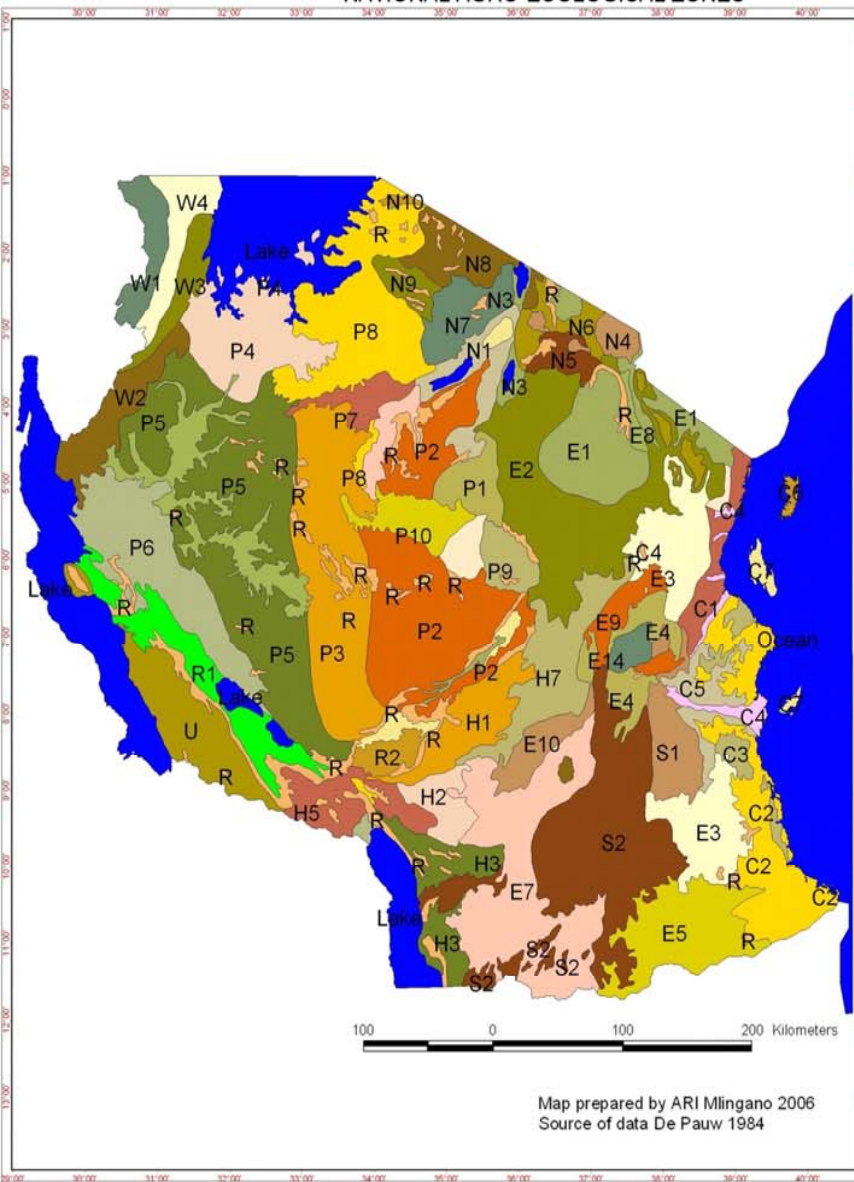








NATIONAL AGRO-ECOLOGICAL ZONES



Aez_code	Altitude(mast)	Rainfall(mm/year)	Physiography
C1	<200	1000-1200	Coastal uplands
C2	<500	800-1000	Coastal lowlands
C3	<500	800-1000	Coastal uplands and rolling to steep hills
C4	<200	1200-1400	Flat, riverine floodplains and deltas
C5	<200	1000-1200	Flat to gently undulating plains
C6	<100	1600-2000	Nearly level to undulating and rolling plains
C7	<100	1400-1600	Nearly level to undulating and rolling plains
E1	500-1200	400-500	Gently undulating to rolling plains
E10	400-600	1400-1600	Flat alluvial plains with complex sedimentation pattern
E11	500-1000	1000-1200	Complex depression
E12	1000-2000	800-1000	Dissected, rolling to hilly mountain
E14	1000-2000	1000-1200	Very strongly dissected mountain block
E15	800-1700	1000-1200	Flat, undulating to rolling plains and plateaux
E2	500-1200	800-1000	Gently undulating to rolling plains and plateaux
E3	200-750	800-1000	Flat to rolling plains
E4	200-500	800-1000	Flat to rolling plains
E5	200-500	800-1000	Level to rolling plains
E6	150-500	1000-12000	Undulating to rolling plains
E7	800-1500	800-1000	Flat to rolling plains, locally hilly at medium altitude
E8	Wide range	500-600	Flat alluvial plains affected by salinity
E9	400-500	800-1000	Flat, alluvial plains with homogenous sedimentation pattern
H1	1500-2000	600-1600	Flat to undulating and rolling plains and plateaux
H2	1500-2100	1400-1600	Undulating to rolling plains
H3	1500-2300	1000-1200	Strongly dissected hills and mountains
H4	500	> 2000	Flat to very gently undulating lacustrine plains
H5	1200-2400	1000-1200	Undulating to rolling volcanic plains and plateaux
H6	2300-2700	1000-1200	Undulating to hilly plateau
H7	1500-2300	800-1000	Mainly mountainous, undulating to hilly plateau crests
Lakes			
N1	1500-2500	600-700	Undulating plains
N10	1500-1800	1400-1600	Undulating to rolling plateaux and plains
N2	2000-2500	800-1000	Rolling to hilly plateau with calderas and volcanic cones
N3	900-1100	400-500	Flat lacustrine plains
N4	900-1600	500-600	Volcanic mountains with gentle to steep slopes
N5	1300-1700	1000-1200	Flat to rolling plains
N6	1300-1700	200-400	Flat to rolling plains
N7	1300-1800	600-700	Level to rolling plains
N8	1300-2300	800-1000	Level to undulating or rolling plains
N9	1100-1800	700-800	Gently undulating plains with some rocky hill-footslope associations
Ocean			
P1	1100-1300	600-700	Undulating plains
P10	1100-1400	500-600	Gently undulating plains
P11	900	500-600	Flat plains
P12	900-1200	600-700	Flat, seasonally inundated plains with permanent or semi-permanent swamps
P13	900-1200	800-1000	Flat, seasonally inundated lowland plains
P2	1100-1300	200-400	Gently undulating plains
P3	1100-1300	800-1000	Gently undulating plains
P4	1200-1300	600-1000	Flat to gently undulating plains with scattered hill-footslope associations
P5	1100-1300	600-1000	Gently undulating plains
P6	800-1800	800-1000	Undulating plains and plateaux
P7	1000-1100	600-700	Flat to very gently undulating plains
P8	1000-1200	600-800	Flat to gently undulating plains
P9	1000-1400	500-600	Gently undulating plains
R			Rocky terrain
R1	800-1000	1000-1200	Flat plains covered by riverine or lacustrine alluvium, saline or sodic and vari
R2	Variable	1000-1200	Flat to very gently undulating plains covered by lacustrine alluvium
R3	900-1400	600-1000	Flat plains covered by riverine alluvium and regularly flooded
R4	1000	1200-1400	Complex terrain
S1	200-500	800-1000	Gently undulating to rolling plateaux
S2	200-1000	1000-1200	Gently undulating to rolling plateaux
U	1400-2300	1000-1200	Complex of flat to gently undulating plains
W1	1300-1800	1000-1500	Dissected hilly plateaux
W2	1500-1700	1000-1500	Strongly dissected hills
W3	1200-1600	800-1000	Undulating to rolling upland plains
W4	1400-1500	1000-1500	Undulating to rolling plains

Tools to determine best localities for large scale biofuels feedstocks production

Where should food crops versus biofuels feedstocks be grown ?

AEZ CODE	SUB ZONE -AREA (Sq-Km)	pH (H ₂ O)	Temperature (°c)	Soils and Topography	Altitude (m)	Rainfall mm/Year	Length of Growing Period and Soil Moisture Properties	Suitable Crops
E3	30,332	4-7	29-31 19-23	Mainly well drained, flat to rolling plains, low altitude developed on intermediate metamorphic rocks. Major soils are well drained, moderately deep to deep, reddish and yellowish sandy clay loams and sandy clays, often with more sandy topsoil, with weak structure and low natural fertility; and somewhat excessively to moderately well drained, moderately deep to deep, reddish, brown or grey loamy sands, sandy loams and sandy clay loams with weak structure and low natural fertility; and well drained, moderately deep to deep, yellowish or reddish sandy clays with weak structure, very low to low natural fertility.	200-750	800-1000	Mainly one DGP 3 - 4½ months varying by 1-4 weeks depending on soil moisture storing properties and crop rooting habits. Onset dates are unreliable. Soil texture varies from medium to heavy textured alluvial with moderate to high AWC (80-150 mm/m) and favourable moisture storing properties (S _{max} 200-350mm). Natural soil fertility shows marked differences between sites, and soil acidity may be common	Maize, sorghum, rice, cassava sweet potatoes, <u>sugar cane</u> , cow pea, pigeon pea, hyacinth bean, citrus, mangoes, passion fruit, pine apple, cashew, coconut, ground nuts, soya bean, sunflower, tobacco, cotton, sisal, <u>jatropha</u> . Grasses and legumes for animals

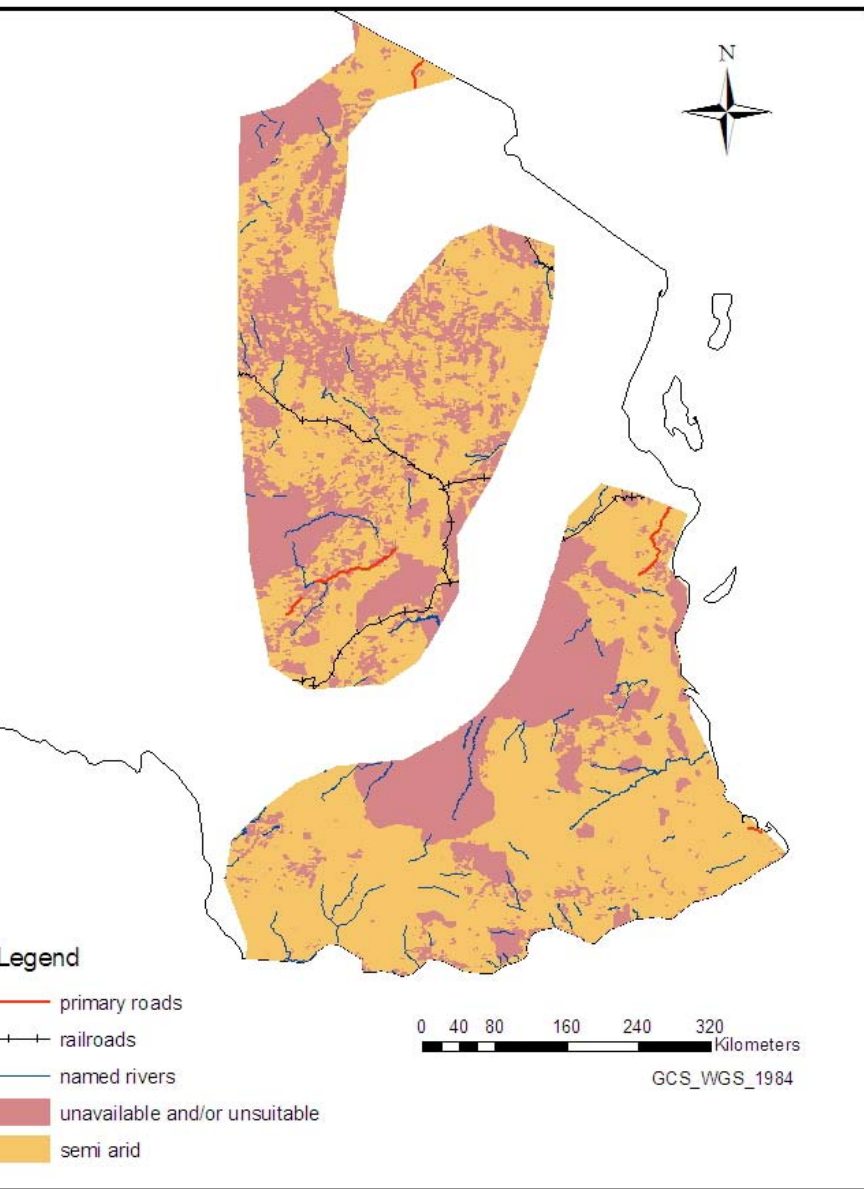
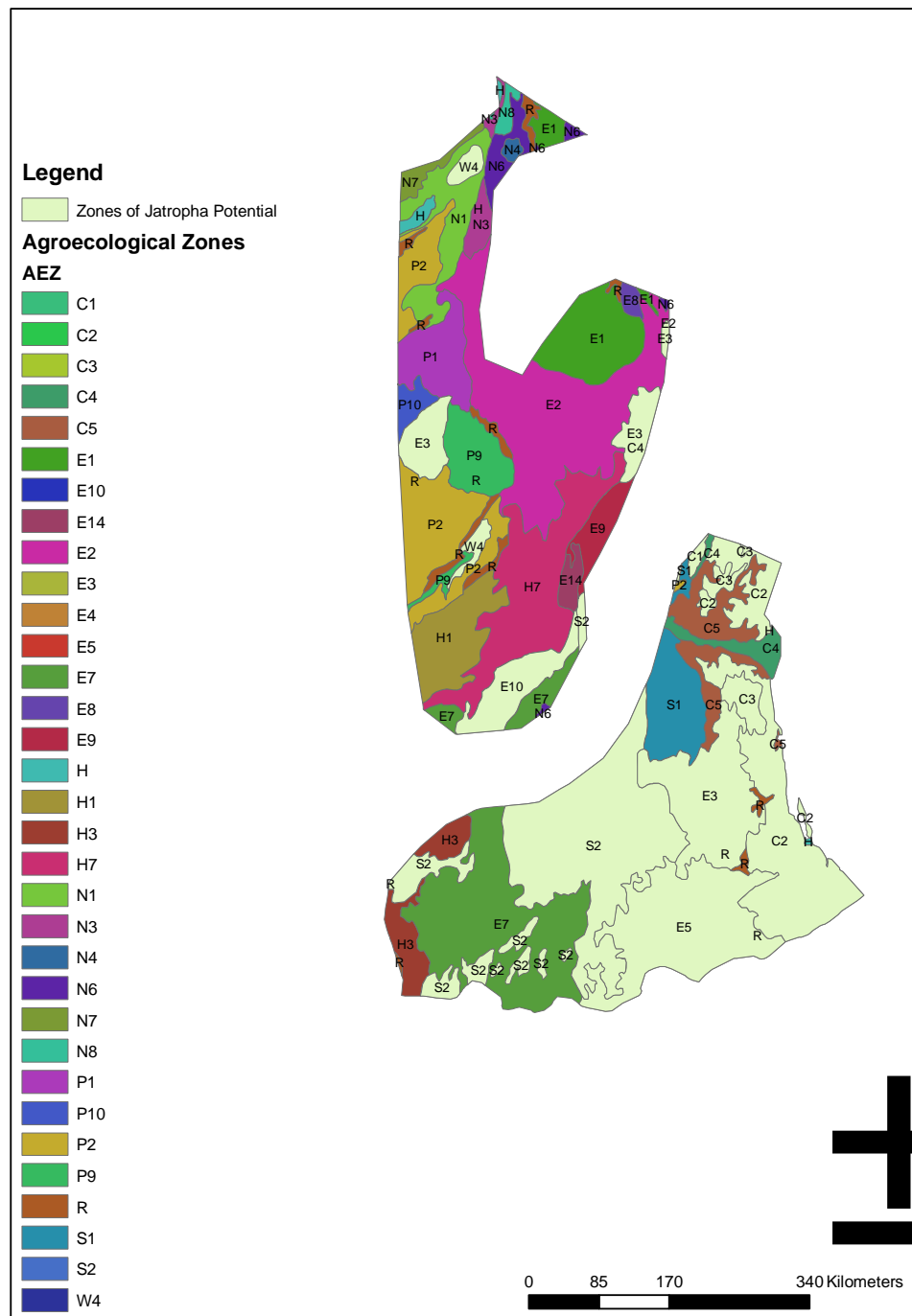


Figure T5: Areas unavailable and/or unsuitable for bioenergy crops relative to primary roads, railroads and named rivers in Tanzania's semi arid regions.

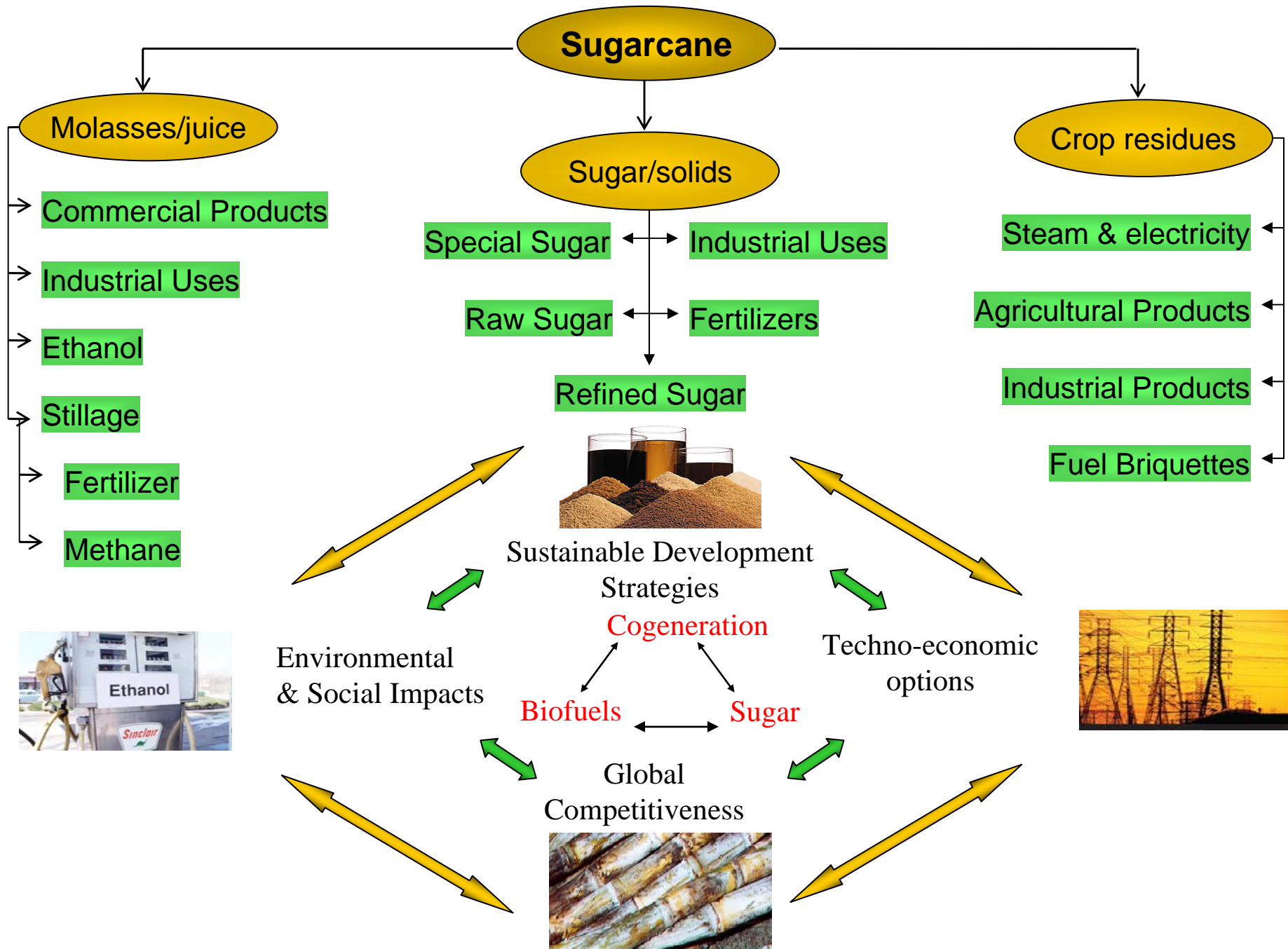


Bagamoya, Tanzania



**WE NEED TO DO THINGS
SMARTER !!!**









KILOMBERO TANZANIA



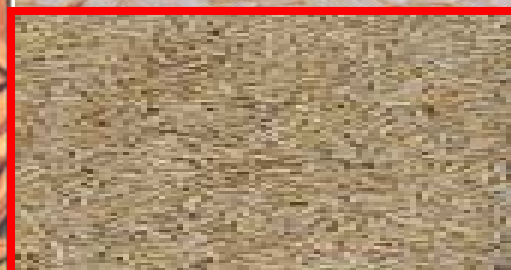
- Payments to community
- Reliable source of income for farmers & contractors
- Access to finance & training for cane farmers & local entrepreneurs
- Potable water supplies
- Hospital, clinic & mobile clinic (10 000 patients per year)
- Housing for employees, teachers, police
- Primary schools & daycare centers





- Courts, community halls, recreation centers
- Indigenous nursery for reforestation of company land
- Free seedlings to community
- New markets for other crops
- Increased incomes enabling more people to afford better education & health services
- Flow on effects on road improvements







**IF WE DO IT RIGHT
THE FUTURE IS
BRIGHT**



Thank you for your attention