Deutsches Biomasseforschungszentrum
gemeinnützige GmbH

Working Group: Biomass potentials and sustainability

DBFZ

Country profile

Montserrat

Status 07/2015

GENERAL INFORMATION

Base Year…………………………… **MEDIAN 2008-2012**

Population…………………………… 5,000

Country area………………………… 10,000 ha

Land area…………………………… 10,000 ha

Agricultural area…………………… 3,000 ha

    Arable land……………………… 2,000 ha

    Permanent crops……………… no data

    Pastures and meadows……… 1,000 ha

Forest area………………………… 2,500 ha

Fallow land………………………… no data

Other land………………………… 4,500 ha

Total primary energy

consumption (TPEC)……………… 1 PJ

Pie chart: Arable land 20%, Permanent crops 0%, Pastures and meadows 10%, Forest area 25%, Fallow land 0%, Other land 45%
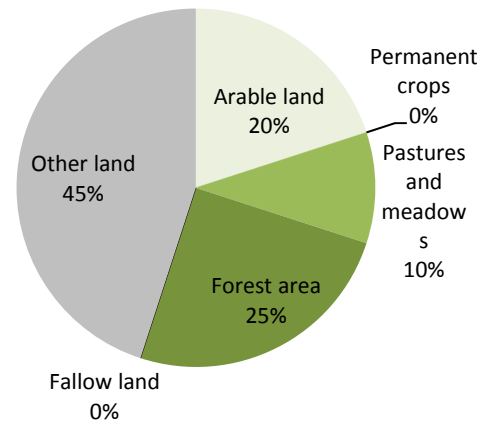
TOP 10 OF BIOMASS RESOURCES BASED ON AVAILABLE DATA

	BIOMASS RESOURCE	THEORETICAL POTENTIAL		TECHNICAL POTENTIAL	UTILIZATION total	free
	TOTAL	**0.13 PJ**	*0.00 PJ**	no data in PJ	no data	no data
1.	Cattle manure	0.10 PJ	-	no data in PJ	no data	no data
2.	Others	0.01 PJ	-	no data in PJ	no data	no data
3.	Fruit, fresh nes	0.01 PJ	-	no data in PJ	no data	no data
4.	Vegetables, fresh nes	0.00 PJ	-	no data in PJ	no data	no data
5.	Tomatoes	0.00 PJ	-	no data in PJ	no data	no data
6.	Potatoes	0.00 PJ	-	no data in PJ	no data	no data
7.	Bananas	0.00 PJ	-	no data in PJ	no data	no data
8.	Pigs manure	0.00 PJ	-	no data in PJ	no data	no data
9.	Chickens manure	0.00 PJ	-	no data in PJ	no data	no data
10.	-	-	-	no data in PJ	no data	no data
	Remaining biomass	-	-	no data in PJ	no data	no data

* This biomass is part of an agricultural product and can not summed up. The share is shown seperately.

Bar chart: TPEC, Technical potential, Theoretical potential, Current utilization — Petajoule (PJ)

- ■ TPEC
- Technical potential
- Theoretical potential
- ■ Current utilization
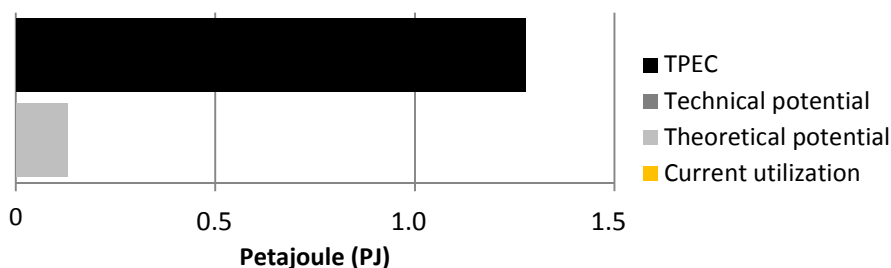
| PJ	Liter Diesel
1	18.5 million
5	92.5 million
10	185.0 million
100	1850.2 million

Assumptions:

Lower Heating Value Diesel: 45,4 MJ/kg,

dense: 0,84 kg/m³

BIOMASS FROM AGRICULTURE   STATISTICS AND CALCULATIONS

TOP 5 of agricultural products from statistics

RANK	MAIN PRODUCT	AREA ha	PRODUCTION t	LHV MJ/kg	ENERGY PJ
	Total	**434**	**1,981**	-	**0.03**
1.	Fruit, fresh nes	52	468	15.0	0.01
2.	Vegetables, fresh nes	48	228	15.0	0.00
3.	Tomatoes	45	215	15.0	0.00
4.	Potatoes	41	210	15.0	0.00
5.	Bananas	50	170	15.0	0.00
	Others	198	690	15.0	0.01
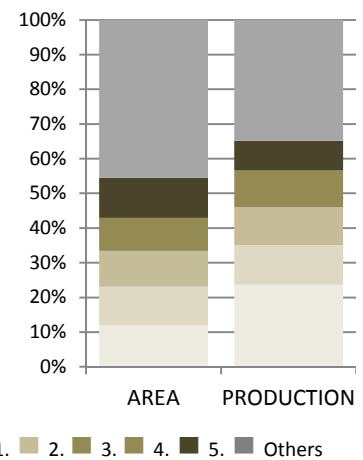
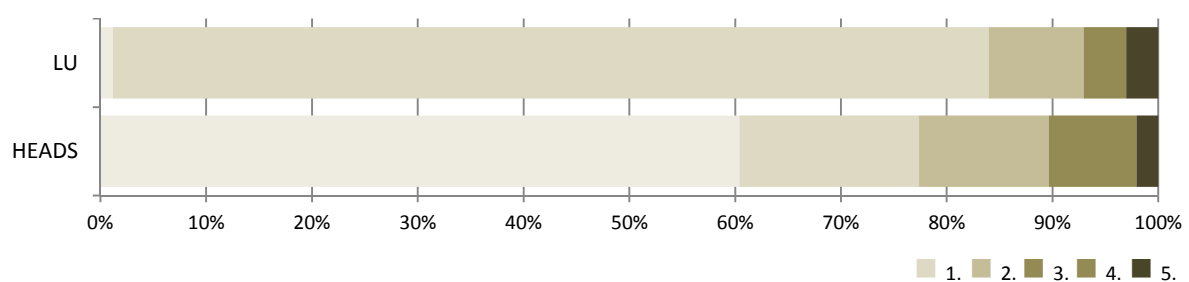*Remarks: In case of no available data for energy content the assumption was set to 15 MJ/kg.*

Residues related to the TOP 5 of agricultural products

MAIN PRODUCT	RELATED RESIDUE	CROP-RESIDUE-FACTOR	t	LHV MJ/kg	ENERGY PJ
1. Fruit, fresh nes	no data	no data	no data	no data	no data
2. Vegetables, fresh nes	no data	no data	no data	no data	no data
3. Tomatoes	no data	no data	no data	no data	no data
4. Potatoes	no data	no data	no data	no data	no data
5. Bananas	no data	no data	no data	no data	no data

Insufficient data!!!

TOP 5 of animal manure

RANK	LIVESTOCK	HEADS in 1,000	LU in 1.000	Calculation		LHV PJ/t	PJ
				t_{manure}/Head	t_{manure}		
	Total	**58**	**12**	-	**149,578**	-	**0.100**
1.	Chickens	35	0	0.0125	438	1.155	0.001
2.	Cattle	10	10	14.8	145,780	0.671	0.098
3.	Goats	7	1	no data	no data	no data	no data
4.	Sheep	5	0	no data	no data	no data	no data
5.	Pigs	1	0	2.8	3,360	0.439	0.001

BIOMASS FROM AGRICULTURE

Source	Biomass	Regional level	Description	Time frame	Theoretical biomass potential		Technical biomass potential		Utilization	
					Value	Unit	Value	Unit	used %	free %
no data										

Lit: literature, Prim: Primary data from surveys

BIOMASS FROM FORESTRY

Source	Biomass	Regional level	Description	Time frame	Theoretical biomass potential		Technical biomass potential		Utilization	
					Value	Unit	Value	Unit	used %	free %
no data										

Lit: literature, Prim: Primary data from surveys

BIOMASS FROM WASTE AND OTHER RESIDUES

Source	Biomass	Regional level	Description	Time frame	Theoretical biomass potential		Technical biomass potential		Utilization	
					Value	Unit	Value	Unit	used %	free %
Lit	Municipal solid waste	National	no data	2000	2,450	t	no data	no data	no data	no data
Lit	Food waste (from MSW)	National	no data	2000	1,149	t	no data	no data	no data	no data
Lit	Food waste (from MSW)	National	no data	2000	2	TJ	no data	no data	no data	no data

results are only listed, not processed on page 1

Lit: literature, Prim: Primary data from surveys

PREFERENCE REGIONS, NEXT STEPS AND DEFINITIONS

TOP 5 PREFERENCE REGIONS

1. no data
2. no data
3. no data
4. no data
5. no data

TOP 5 NEXT STEPS FOR RESEARCH

1. Harmonize literature data with statistical data to find a comparable basis.
2. Identify the technical potential of the most important biomass resource(s).
3. Find specific locations for an utilization.
4. Find sustainable concepts for biomass supply.
5. Ensure the sustainable distribution of power and heat.

DEFINITIONS

Arable land	Capable of being ploughed and used to grow crops.
Permanent crops	Cultivable land that is not being used for annually-harvested crops.
Theoretical biomass potential	Means the maximum without any regard to other demands like food, fodder or material use. This information gives a very first overview about available data regarding the amount of biomass that exists in the selected country.
Technical biomass potential	Includes all relevant restriction and competing uses. But, the calculations in literature (if available) often take only some of the restrictions into account. Also different time horizons and geographical coverage can cause huge inconsistencies. Consequently, various results can exist for the same resource.

CONTACT

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ACKNOWLEDGEMENT
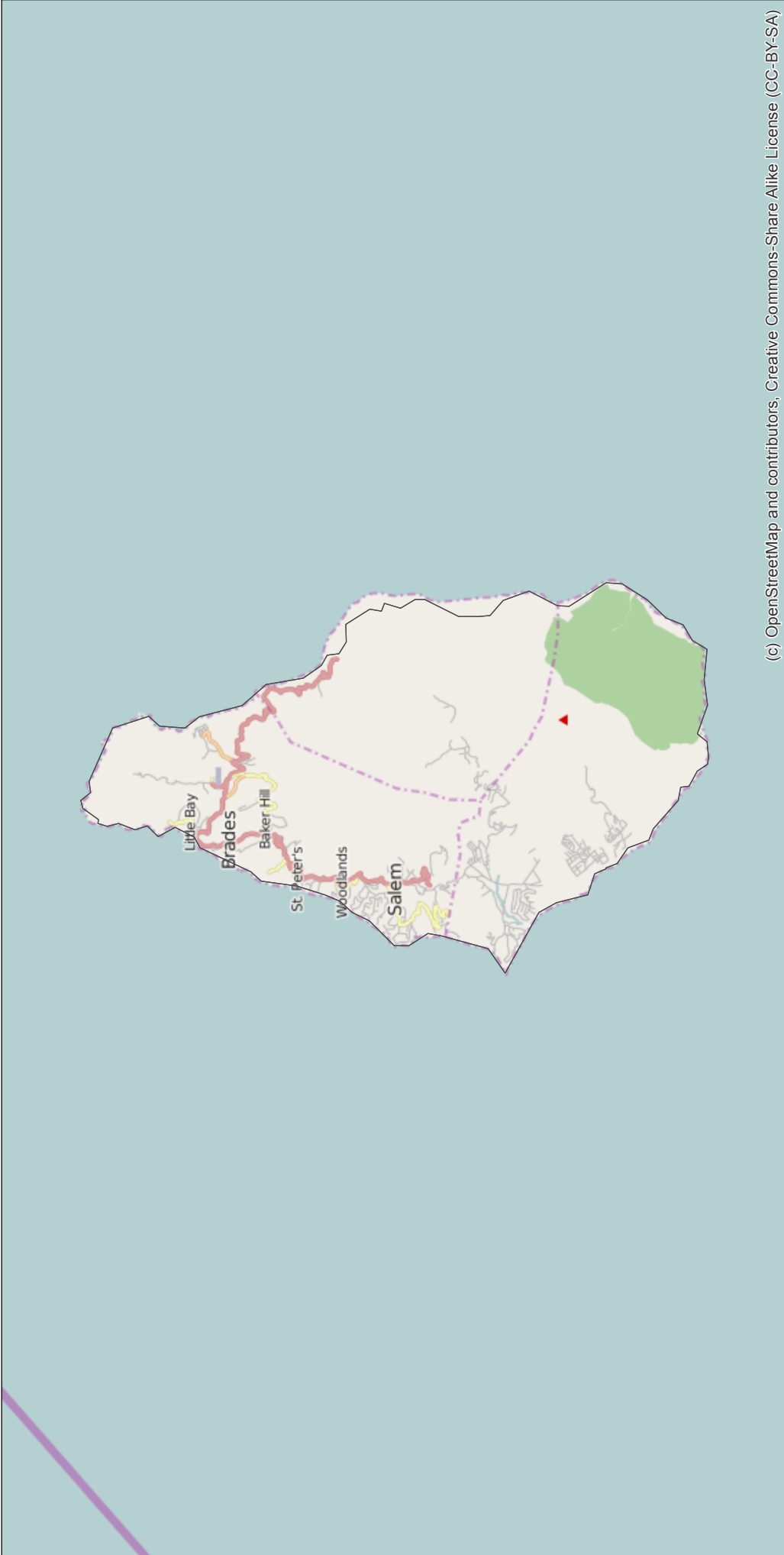
Montserrat

☆ Brewery   ★ Juice Production   ★ Rum Distillery   ✳ Sugarcane Factory

◆ Farmer   ◣ Landfill   ✳ Sawmill   ■ Landfill/Transfer Station

0   5   10   20
Kilometers

DBFZ

CARICOM

July 2015

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DATA DESCRIPTION

DATA DESCRIPTION AND REFERENCES

The "Country Profile" is a very first and quick option to get an overview about the available information on biomass resources in the selected country. The results are based on statistics, literature , surveys and calculations made by DBFZ/Germany. **Because of insufficient data the results have to interpreted with the awareness of uncertainties! The compilation has not the claim of completeness!**

PAGE 1

Page 1 contains general information on population, land use and total primary energy consumption (TPEC) as well as a summary about the most important biomass resources. Furthermore, page 1 presents a chart with the share of energy content of the compiled data compared to the TPEC.

Page 2

Page 2 shows the TOP 5 results for agricultural products, its related residues and results for animal manure as well. The data on this page is based on official FAO-Statistics and calculations/conversions made by DBFZ.

Page 3

Page 3 is focused on additional data from literature and primary data collection. Results are presented with the most relevant level of information. The tables contain a specific identification of the biomass that is also categorized into "Biomass from agriculture", "Biomass from forestry" and "Waste and other residues", the regional level (e.g. national, regional, local), a description (if necessary) and the underlying time frame. The results for theoretical and/or technical potential are shown in units that were mentioned in literature. Mainly, the authors describe the compiled potentials in different units. Relevant information (e.g. specific factors for mass, volumina, energy content etc.) for a objectively consideration is often missing. This circumstance makes it difficult to find a common level for a comparison. In context of these "Country profiles" the data from literature and survey is only listed but not processed. Please contact the DBFZ for further information.

PAGE 4

Page 4 contains qualitativ information for TOP 5 "Preference regions", TOP 5 "Next steps for research". These information present options for the discussion about an efficient development of biomass resources.

PAGE 5

On page 5 a thematic map presents an overview about the selected country. In conjunction with basic information (open street maps) also collected primary data is included. Because of a better handling the spatial information is referenced as a number. Please check country profile's annex for further description. In case of aggregated regions please contact DBFZ.

REFERENCES

General information (page 1), biomass from agriculture (page 2) and factors for residues and/or energy content

FAO Statistics 2015: http://faostat.fao.org/ | U.S. Energy Information Administration, http://www.eia.gov/cfapps/ ipdbproject/IEDIndex3.cfm?tid=44&pid=44&aid=1 | Koopmans, A., Koppejan, J. 1998: Agricultural and forest residues - generation, utilization. and availability, in: http://www.fao.org/docrep/006/AD576E/ad576e00.pdf; 27.01.2015 | Thrän et al. 2010: Global and regional spatial distribution of biomass potentials - status quo and options for specification, in www.dbfz.de/web/fileadmin/user_upload/ DBFZ_Reports/DBFZ_Report_7.pdf, 08.06.2015 | S. Prasertsan et al. 2005: "Biomass and biogas energy in Thailand: Potential, opportunity and barriers"; 13 September 2005 | Akgün, O., Korkeakoski, M., Mustonen, S., Luukkanen, J. 2011: Theoretical Bioenergy Potential in Cambodia and Laos, Bioenergy Technology (BE), World Renewable Energy Congress 2011 - Linköping Sweden, 08-13.05.2011, available at: http://www.ep.liu.se/ecp/057/ vol1/045/ecp57vol1_045.pdf | EGGLESTON H.S. et al. (ed.): INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC): 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5 Waste, Prepared by the National Greenhouse Gas Inventories Programme, IGES, Japan, 2006

Country-specific sources from literature and surveys (page 3)

LITERATURE: no data | SURVEYS: no data

SPATIAL REFERENCES

Number	Name	Description	Type of biomass	Amount
no data				