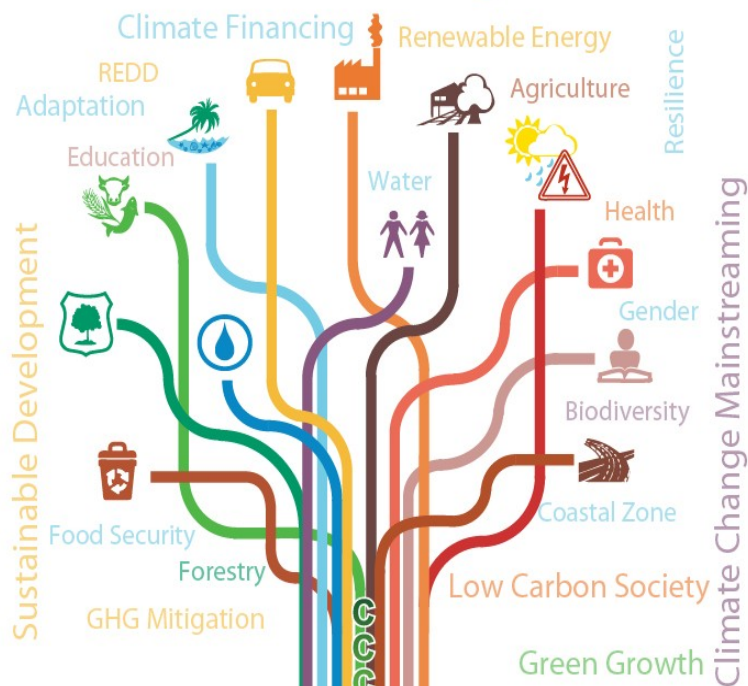


3rd National Forum on Climate Change

5 – 7 November 2013, Cambodia

“Taking Action for Sustainable Development in the Changing Climate”

Climate Change



Responses to CC impacts in agriculture, agro-industry, rubber and livestock

Dr. Sar Chetra

6 November 2013

CAMBODIA CLIMATE CHANGE ALLIANCE

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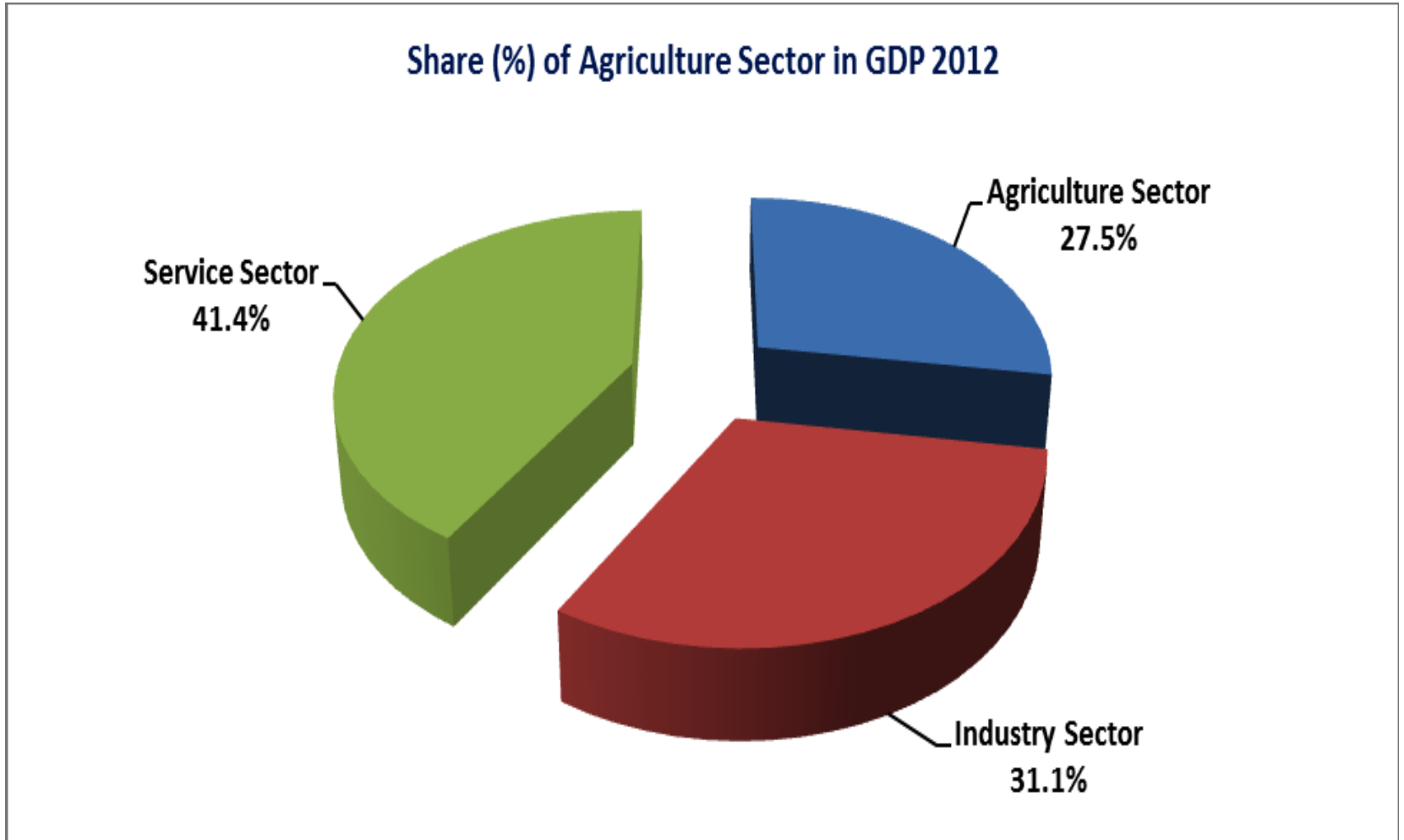
Outline

- Agriculture in Cambodia
- Some causes of CC
- Effects of CC on agriculture
- Responses to impacts of CC for the next 5 years (2014-2018)

Agriculture in Cambodia

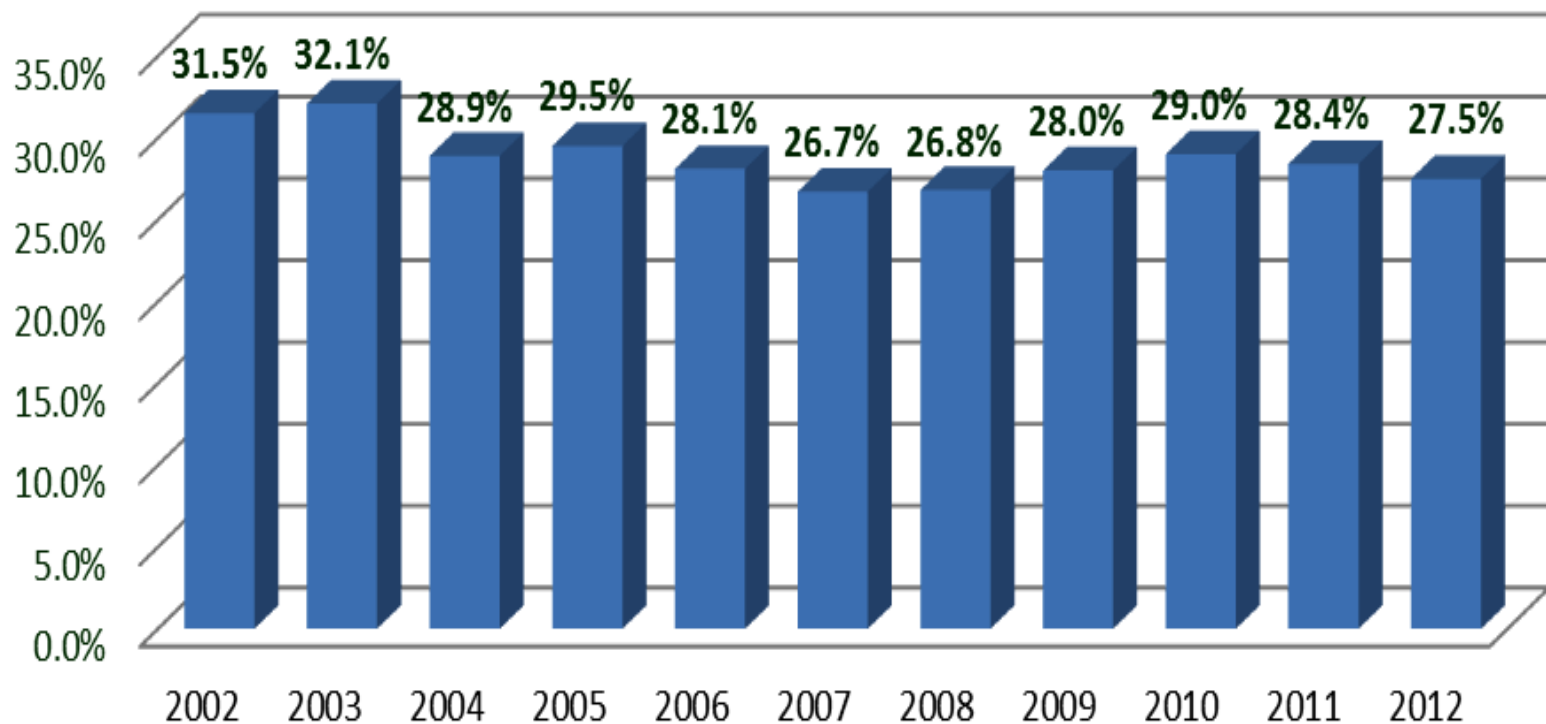
- ❑ Cambodia is an agrarian economy;
- ❑ About 80% of population in rural area engages in farming;
- ❑ Agriculture provides:
 - food for daily consumption
 - Input for industrial processes
 - Source of national revenue from production and export
- ❑ Agriculture plays an important role in sustaining economic growth, ensures equity and food security, and promotes rural development

Share of agriculture (%) in GDP, 2012

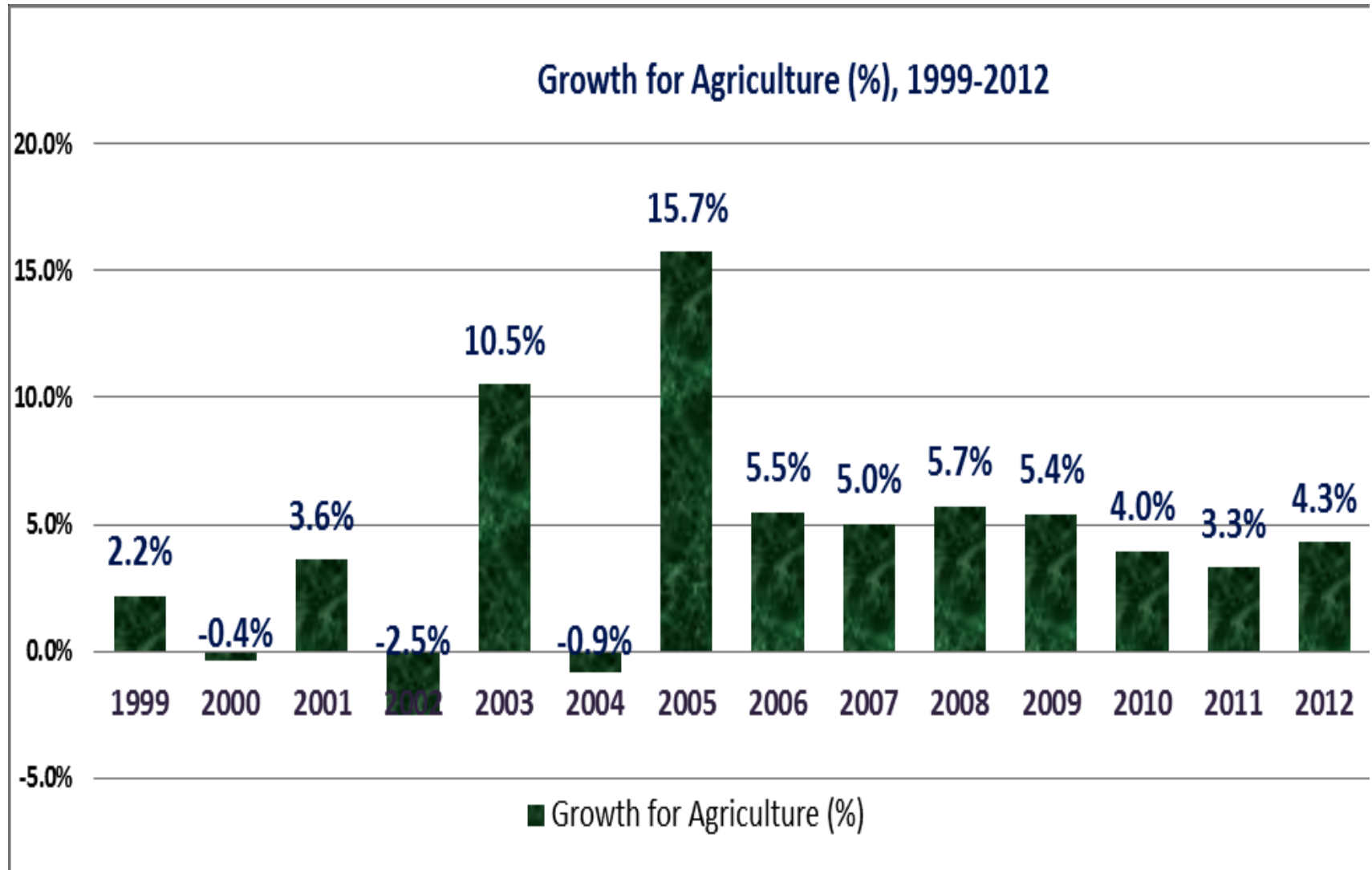


Share (%) of agriculture sector in GDP, 2002-2012

Share (%) of Agriculture Sector in GDP, 2002-2012
(Constant Price 2000)

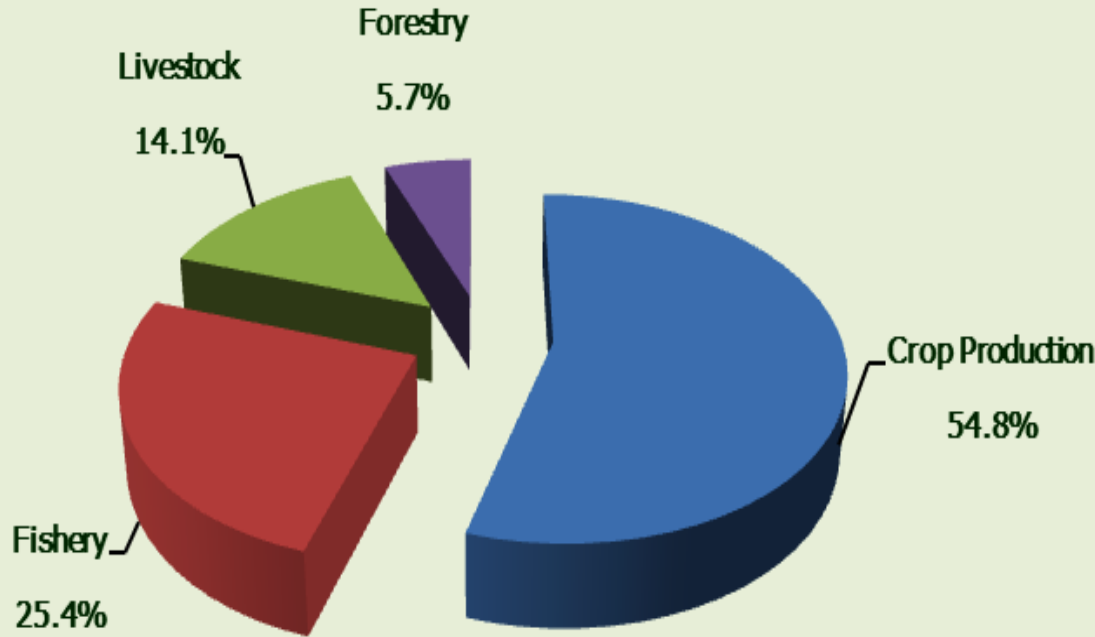


Growth (%) of Agriculture, 1999-2012

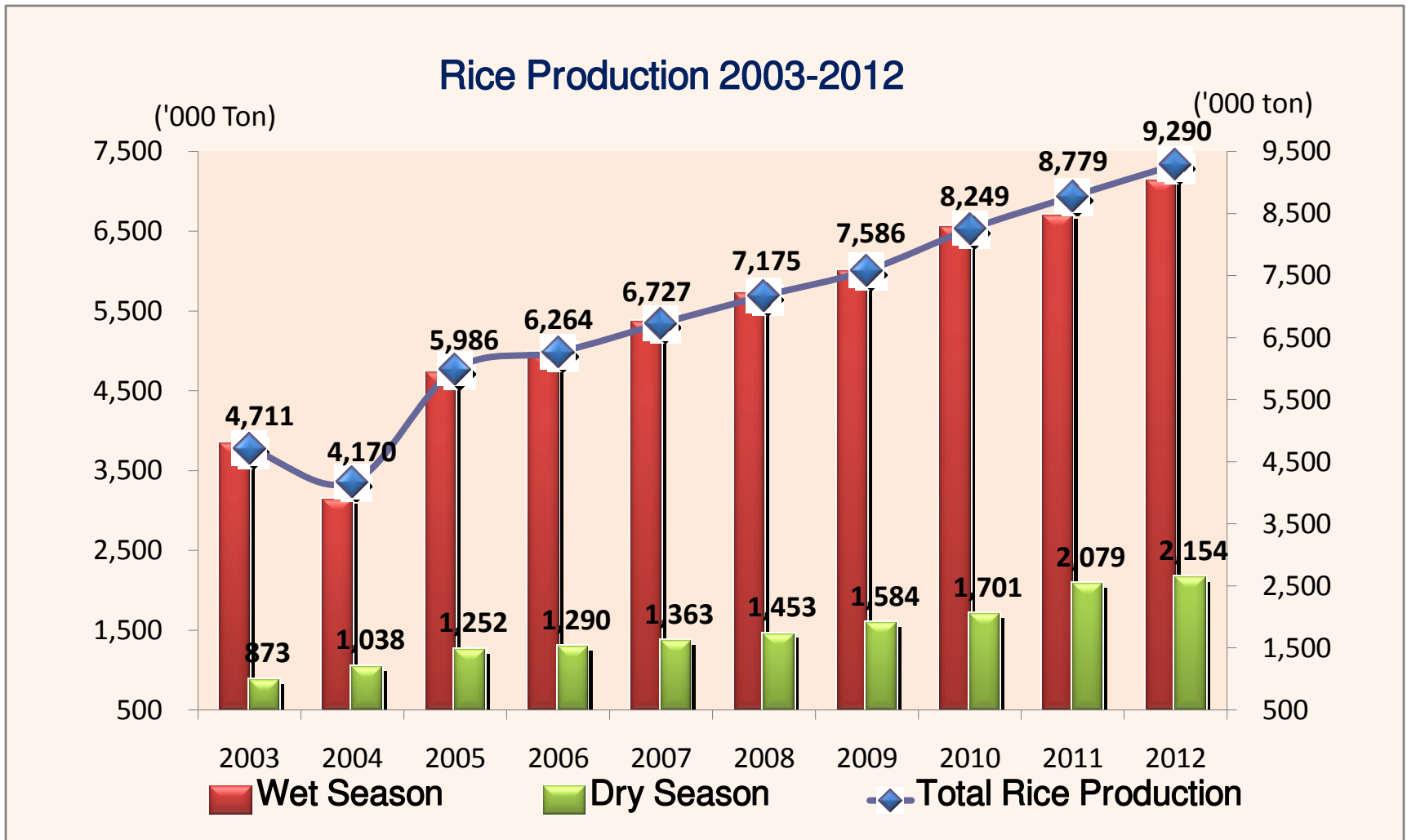


Contribution (%) of sub-sectors in GDP from Agriculture, 2012

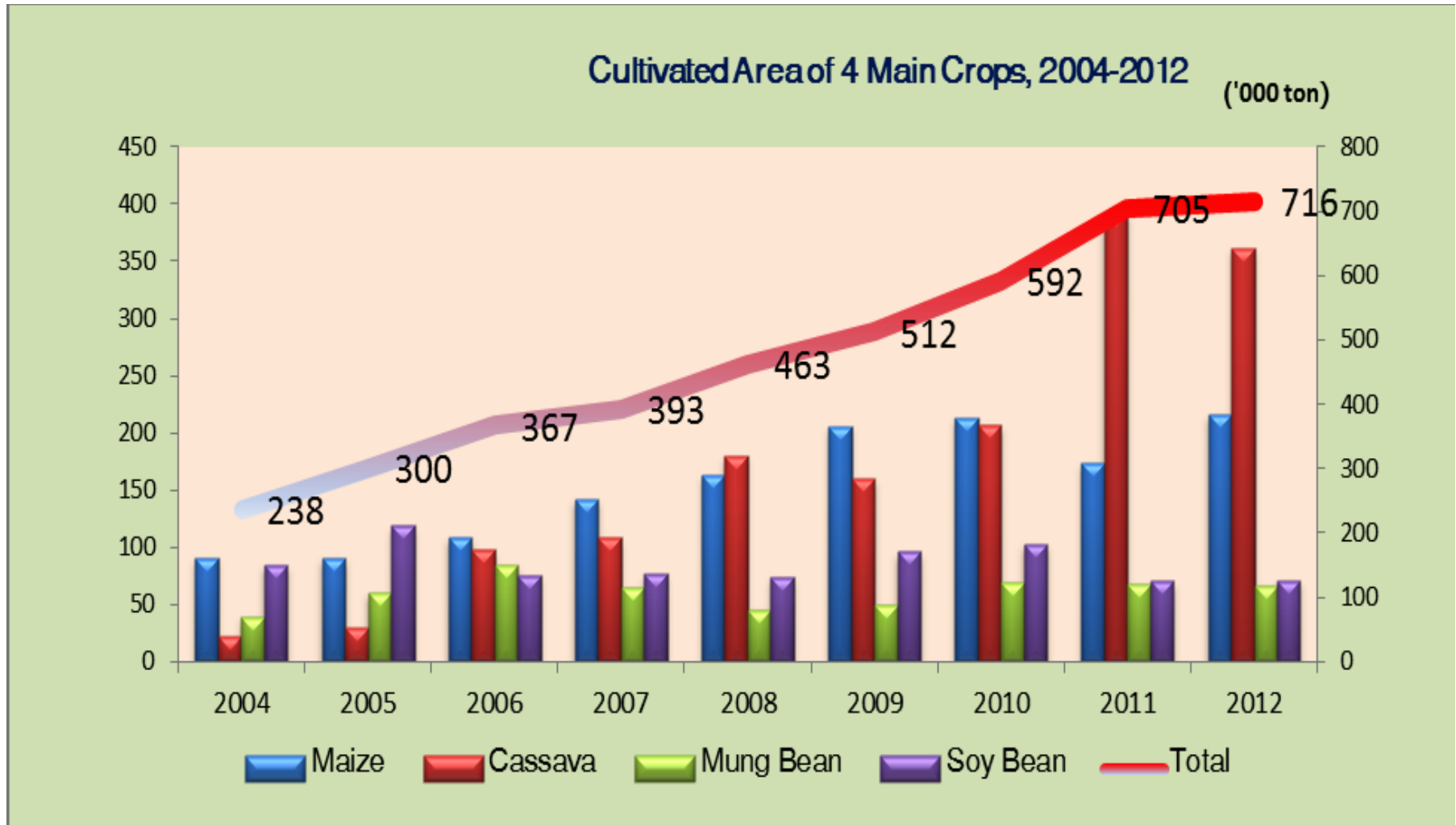
Composition of Sub-Sector in Agriculture, 2012



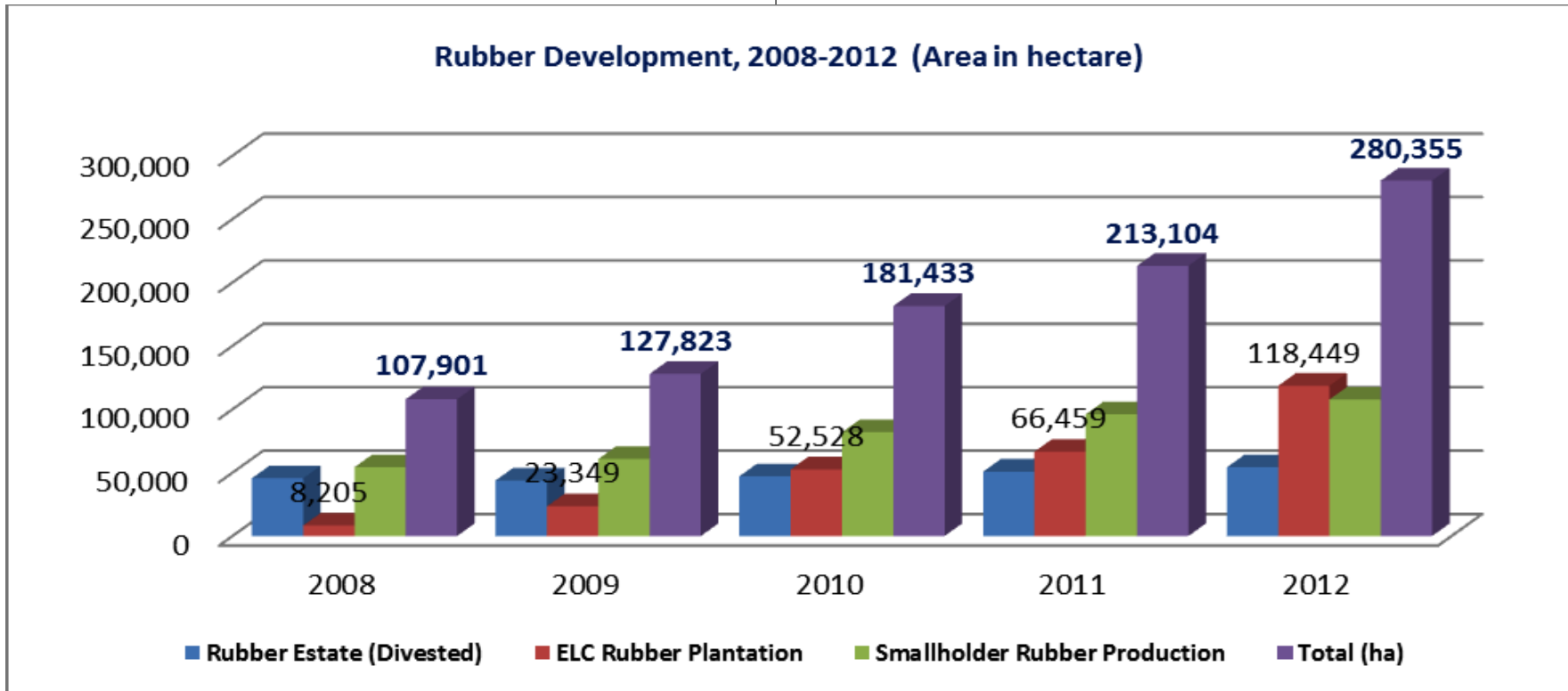
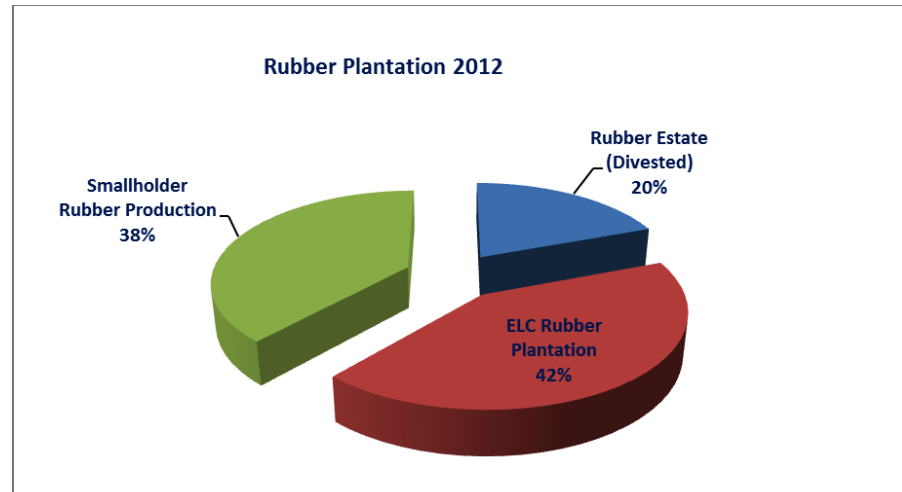
1. Rice production



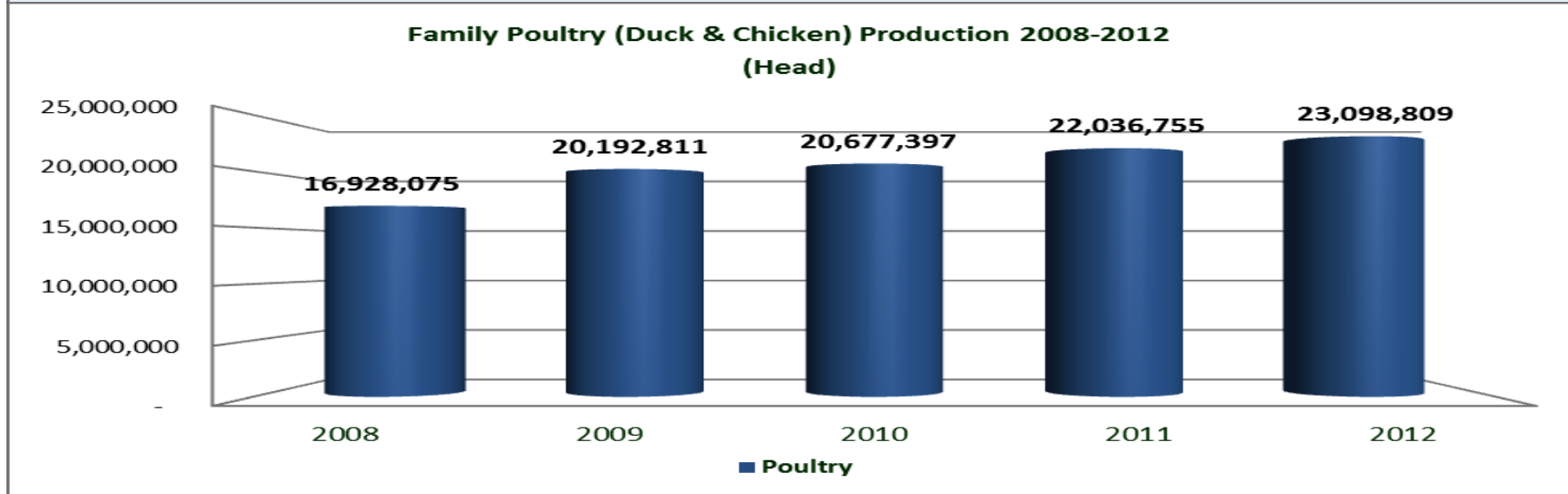
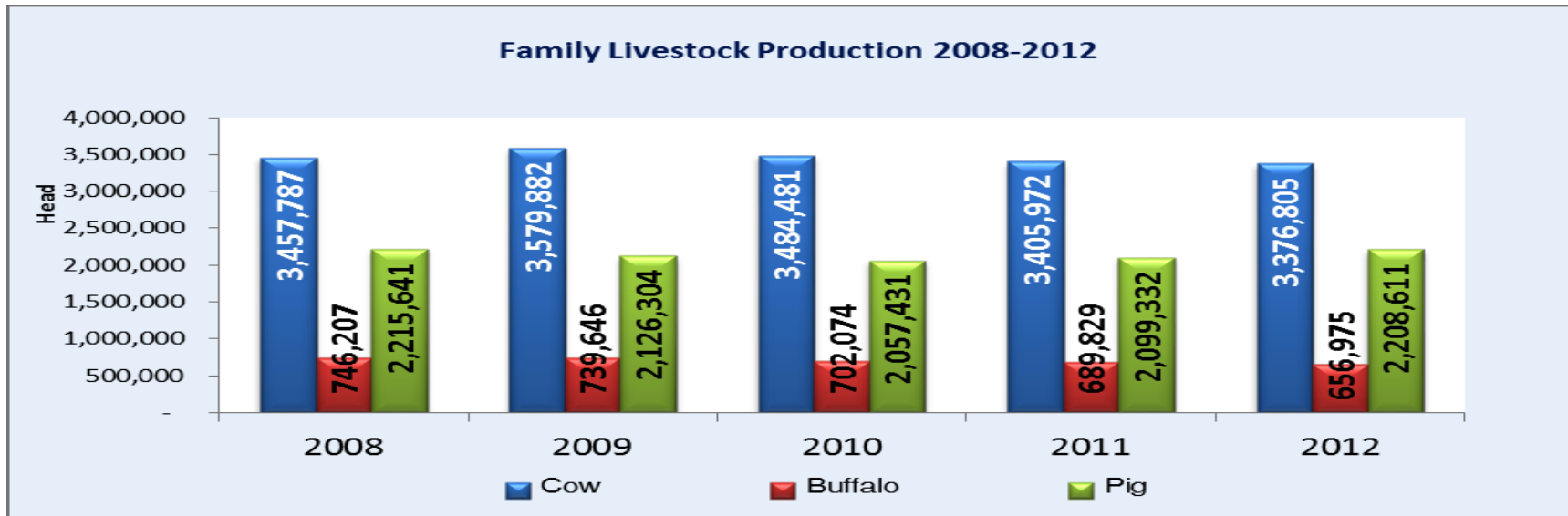
2. Cultivated areas of selected cash crops



3. Rubber production



4. Animal production



Some causes of CC

- Key factors to CC is the global warming causing change in climate
- Factors causing CC include:
 - ✓ Movement of earth crusts;
 - ✓ Effects of solar radiation;
 - ✓ Change in earth orbit;
 - ✓ Volcanic eruption;
 - ✓ Change in ocean currents;
 - ✓ **Human activities.**

Anthropogenic factors

- ❑ Human activities increasingly affect environment such as global warming for the last few decades
- ❑ Main problems resulted from human activities on the environment include higher concentration of GHGs from combustion of fossil fuels (oil, coal, cement, ... production)
- ❑ Other factors contribute to an increase in GHGs including:
 - ✓ land use
 - ✓ Ozone depletion
 - ✓ Agriculture
 - ✓ Livestock farming
 - ✓ Deforestation, etc.



Emission of GHGs from Cambodia's Agriculture Sector

1994 in Gg, MoE

Sources	Emission by type				CO2-Equi.	%
	CH4	N2O	NOx	CO		
Domestic livestock	184.8	3.9			5.084	48.1
Rice farming	150.4				3.158	29.9
Burning of grassland	2.0	0.0	0.9	51.9	49	0.5
Burning of agricultural residual	2.1	0.1	1.8	43.9	59	0.6
Agricultural soil		7.1			2.209	20.9
Total	339.3	11.1	2.7	95.8		
CO2 equivalent					10.560	100.0

2000 in Gg, MoE

AGRICULTURE greenhouse gas source categories	CH₄	N₂O	Total CO₂eq (Gg)	Total CO₂eq (%)
Enteric fermentation	163.82		3,440.31	16
Manure management	22.37	1.11	812.90	4
Rice cultivation	684.05		14,365.01	68
Agricultural soils		7.62	2,363.69	11
Prescribed burning of savannahs	2.19	0.03	54.34	0
Field burning of agricultural residues	3.09	0.04	75.91	0
Total	875.52	8.79	21,112.16	100

Effects of CC on Agriculture

1. Enhanced hunger and malnutrition

- ❑ Adverse effects on existing livelihood and food insecurity of farmers, fishers and forest dependent communities
- ❑ Risks to crop failure, decreased animal production, inaccessibility to fisheries and forest products
- ❑ Extreme climate events will affect food security (accessibility, stability, and consumption)



Effects of CC on Agriculture, Cont.

2. Outbreak of diseases

- ❑ Emerging diseases affect crop and animal production
- ❑ New risks in terms of food security, food safety and human health



Region

- UNFCCC
- ASEAN (AFCC)
- GMS (Core Environmental Programme)

RGC

**RG III; First rectangle –
Promote agriculture**

MAFF

**Promote
production, diversification,
and agro-businesses
(Sustainable natural
resource management)**

MAFF

5 year strategy to respond to impacts of CC (2014-2018)

5 year strategy to respond to impacts of CC (2014-2018) (Agriculture, Agro-industry, Rubber and Animal Production)

□ MAFF

- Decision #567 dated 07 November 2011 established a working group to develop policy and strategic plan to respond to CC
- Head of the working group: HE Ty Sokhun, Secretary of State, MAFF
- 5 technical entities (DG of Agriculture, DG of Rubber, FA, FiA, DAHP)

Strategic Objectives

- [Agriculture and Agro-industry](#)

Ensure food security and promote livelihood of farmers through enhanced agricultural and agro-industrial productivity by 10% with promotion of development and effective and appropriate use of renewable technologies and water as well as strengthening CC adaptation and mitigation capacity;

- [Rubber](#)

Promote sustainable production of natural rubber with a focus on CC adaptation and mitigation measures.

- [Animal production](#)

Promote animal production development by 3% annually and sustainable animal health care through capacity development, application of appropriate technologies sensitive to public health and participate in CC mitigation of 1% emission annually from animal production by 2015.

Strategic objective, Cont.

- Agro-industry

#	Strategic actions
1	Promote intensification and diversification of crops in accordance to their agro-ecological zones with effective use of water, conservation and utilization of plant resources
2	Strengthen research capacity i.e., science, technology and innovation
3	Promote low emission development
4	Strengthen institutional capacity to facilitate actions in addressing natural disaster and human development
5	Strengthen capacity of agriculture and agro-industry entrepreneurs and agricultural associations to share their responsibility for causing CC

Strategic objective, Cont.

- Rubber

#	Strategic actions
1	Promote application of clone rubber adaptable to CC
2	Promote development of new clone rubber adaptable to CC in the agricultural environment of Cambodia
3	Promote research on CC impacts on rubber at different farming systems and access to carbon credit from rubber plantation
4	Develop capacity of officials to respond to CC in rubber sector
5	Enhance technical capacity for rubber plantation to promote good agricultural practices in rubber planting and raise awareness on CC impacts, adaptation and mitigation
6	Promote effective use of input in rubber processing and rubber woods

Strategic objective, Cont

- Animal production

#	Strategic actions
1	Facilitation for animal production
2	Scientific and technological development
3	Strengthening capacity and dissemination
4	Market response
5	Intervention and rescue
6	Improvement of animal feeding
7	Management of pasture land
8	Reduction of animal based feed
9	Waste management
10	Strengthening legal framework and law enforcement

Action Plan

- Agriculture and Agro-industry

Strategic actions		Key activities	Budget (USD Millions)
1	1.1	Application of appropriate farming techniques and agricultural systems	13.47
	1.2	Application of post harvest technology	1.00
2	2.1	Development of seeds appropriate to agro-ecology and CC	14.35
	2.2	Research and development of appropriate techniques for adaptation to CC	10.50
	2.3	Development of post harvest technology	2.70
	2.4	CC information and knowledge management for farmers and relevant stakeholders	2.60
3	3.1	Application of technologies contributing to GHGs emission mitigation	7.27
4	4.1	Development of policy and regulation	0.7

Action Plan, Cont

- Agriculture and agro-industry, Cont.

Strategic actions		Key activities	Budget (USD Millions)
5	5.1	Development of support policy that encourages participation of agricultural and agro-industrial enterprises and agricultural associations to participate in development and take responsibility for their contribution to CC	0.15
	5.2	Dissemination and promotion of implementation of support policy and incentives and legal frameworks relevant to CC adaptation and mitigation for agricultural and agro-industrial enterprises and agricultural associations	0.20
	5.3	Development of capacity for relevant competent agencies with authority to monitor and assess performance by agricultural and agro-industrial enterprises and agricultural associations	0.20
	5.4	Delivering of training on appropriate low emission technology for agro-industrial enterprises	1.00
Total for agricultural and agro-industrial sectors			56.04

Action Plan, Cont

- Rubber

Strategic actions		Key activities	Budget (USD Millions)
1	1.1	Promotion of exchange of programme for rubber seedlings with neighboring countries in the region	1.78
	1.2	Awareness raising on application of CC resilient clone rubbers to owner of rubber plantation	0.16
2	2.1	Development and put in place 3 rubber nurseries	0.99
	2.2	Development of Seedling Evaluation Trial (SET)	0.23
	2.3	Development and maintenance of 2 Small Scale Clone Trial (SSCT)	0.59
	2.4	Development and maintenance of a Large Scale Clone Trial (LSCT)	0.66
	2.5	Making recommendations on all 8 clones for property of each clone	0.02

Action Plan, Cont

- Rubber, Cont

Strategic actions		Key activities	Budget (USD Millions)
3	3.1	Development of trial network and establishment of 5 small Met stations at existing plantations in Kampong Cham, Kampong Thom, Battambang, Ratanakiri and Koh Kong	1.33
	3.2	Analysis of data and studying of correlations between growth and biomass by rubber variety	0.15
4	4.1	Participation in CC network to access and share new findings on CC	0.16
	4.2	Collaboration with DPs to send technical staff for medium and long terms trainings on CC modeling, regional planting modeling, and CC responses	0.33
5	5.1	Establishment of household rubber community	0.08
6	6.1	Development of facility for treatment of effluent from rubber processing and management and use of biogas from liquid waste	0.17
Total Rubber Sector			6.65

Action Plan, Cont

- Animal production

Strategic actions		Key activities	Budget (USD Millions)
1	1.1	Animal raising using appropriate techniques	7.50
	1.2	Study potential for animal production	0.75
	1.3	Application of integrated farming in animal production	0.40
2	2.1	Improvement of animal varieties	3.92
	2.2	Improvement of feed	4.30
	2.3	Promotion of animal health	3.05
3	3.1	Development of awareness materials on CC, adaptation and dealing with CC, technique based animal raising, animal health protection and care from disease outbreak, planting of animal feed, feed processing, seed selection and artificial breeding, and animal waster management	0.30
	3.2	Assessment and review of past awareness raising and demonstration activities	0.05

Action Plan, Cont

- Animal production, Cont.

Strategic actions		Key activities	Budget (USD Millions)
4	4.1	Development of clearing house, market and dissemination of animal markets and animal products particularly under CC (flood for example)	0.20
	4.2	Scale out community animal production more extensively	0.20
5	5.1	Prepare for animal feed, water and medicines and medical instruments for animal care and prepare for animal seeds for flood and drought events	1.00
	5.2	Prepare safe grounds and ensure shelter for animals at time of disaster	0.20
	5.3	Development of mobile animal treatment for animals in large assemble	0.10
	5.4	Development of post disaster rehabilitation plan	0.05
6	6.1	Application of mixed animal feed to enhance their effectiveness	0.20
	6.2	Promotion of processing of agricultural residue to reduce emission from those residue (biomass)	0.20

Action Plan, Cont

- Animal production, Cont

Strategic actions		Key activities	Budget (USD Millions)
7	7.1	Planting animal feed in rice field with carbon stocks and application of nitrogen in pasture land	0.10
	7.2	Promotion of rotational use of pasture land	0.50
8	8.1	Study of adverse effect of excessive consumption of meat on public health	0.25
9	9.1	Continue promotion and scale out existing national biodigester programme widely to livestock farmers	4.00
	9.2	Development and application of national biodigester programme for commercial scale	2.00
	9.3	Research on development of household and commercial biodigester	0.15
	9.4	Development of capacity for carbon credit from biodigester	0.25

Action Plan, Cont

- Animal production, Cont

Strategic actions		Key activities	Budget (USD Millions)
10	10.1	Development of policy for pasture land	0.25
	10.2	Development of regulation, policy, and strategy for animal health and production and management of animal wastes	0.25
	10.3	Enforcement of law and regulation relevant to animal health and production	0.05
Total for animal health and production			30.40

Action Plan, Cont

- Cross cutting (Agriculture, agro-industry, rubber, fisheries, forestry and animal production):

Strategic objective		Key actions		Budget (USD Millions)
1	Land use zoning for agricultural production, rubber, and animal production	1.1	Mapping of areas for agricultural production, rubber and animal production	10
		1.2	Defining agricultural zones for agricultural and animal production	8
		1.3	Defining forest management zones	0.65
		1.4	Defining fisheries management zones	0.75
2	Development and establishment of modeling for agricultural production under CC condition in Cambodia	2.1	Training of human resources overseas for long terms (2 yr.) and short term (2months) and acquiring consultants with modeling skills for development projection	0.56
		2.2	Collection of data and preparation of trial	4.62
		2.3	Development of modeling for agricultural production under CC condition	0.47

Action Plan, Cont

- Cross cutting (Agriculture, agro-industry, rubber, fisheries, forestry and animal production), Cont:

Strategic objective		Key actions		Budget (USD Millions)
		2.4	Test the established modeling for agricultural production	1.70
		2.5	Study modeling on impacts of natural disasters on agriculture (animals)	0.5
3	Development and promotion of capacity for training, awareness raising and transfer of applied technology in response to CC	3.1	Training on application of post harvest technologies	3
		3.2	Development of post harvest technologies	7
		3.3	Building technical capacity for competent agencies on CC	8.63

Action Plan, Cont

- Cross cutting (Agriculture, agro-industry, rubber, fisheries, forestry and animal production), Cont:

Strategic objective		Key actions		Budget (USD Millions)
		3.4	Training and development of human resources at all levels	1.20
		3.5	Training on CC mitigation and adaption technologies to farmers and relevant stakeholders	4
		3.6	Develop programme and provide training of trainers for 200 participants (30% women) for each training/yr/region on agricultural, crop, rubber and livestock farming techniques, application of GAP and GAHP and mainstreaming awareness on CC impacts and adaptation and mitigation for their further training	0.60
		3.7	Develop programme and provide training to all relevant stakeholders on recent waste processing techniques and application of biogas and mainstream awareness on impacts, adaptation and mitigation of CC	0.40

Action Plan, Cont

- Cross cutting (Agriculture, agro-industry, rubber, fisheries, forestry and animal production), Cont:

Strategic objective		Key actions		Budget (USD Millions)
		3.8	Institutional and human resource capacity building and other agencies to enhance knowledge on development of agriculture production, rubber and animal production and dealing with CC	2.50
		3.9	Extensive awareness raising using materials produced and conduct outreach activities on animal feed and artificial breeding to enhance resilient to climate	1.25
		3.10	Educate, disseminate, and encourage appropriate use of animal based feed	0.25

Action Plan, Cont

- Cross cutting (Agriculture, agro-industry, rubber, fisheries, forestry and animal production), Cont:

Strategic objective		Key actions		Budget (USD Millions)
		3.11	Planning and provision of training for central and local FA officials on REDD+	0.25
		3.12	Capacity building for FA officials on enforcement of forest law and good governance	0.15
		3.13	Promotion of awareness on importance of adaptation and mitigation of CC to local communities	0.10
		3.14	Provision of training on conservation and management of flooded and mangrove forests, seagrass and coral reef and functions in adaptation and mitigation of CC in fisheries to build capacity	0.16
		3.15	Need assessment and public awareness	1.50

Action Plan, Cont

- Cross cutting (Agriculture, agro-industry, rubber, fisheries, forestry and animal production), Cont:

Strategic objective		Key actions		Budget (USD Millions)
4	Response to gender in agriculture to CC through capacity building and human resource development	4.1	Delivery of training to women to build awareness and knowledge on impacts and mitigation of negative impacts from CC	2.50
		4.2	Promote women in agriculture livelihood resilient to CC	0.25
		4.3	Promotion of financing initiatives for agricultural livelihood in response to CC and gender sensitive	0.75
Total cross cutting				61.74

Conclusions

- ❑ Agriculture contributes to development of household and national economy;
- ❑ At the same time, agriculture also contributes to GHGs emission and CC;
- ❑ However, MAFF has been developing policy and strategic plan to respond to CC and action plan with the aims to:
 - Participate to prevention emission of GHGs to the environment and adaptation to CC
 - Ensure food security and safety and public health.

Thank You !

Contacts

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