

Study on the Impact of Heat Stress on Human Productivity and Economy in Cambodia

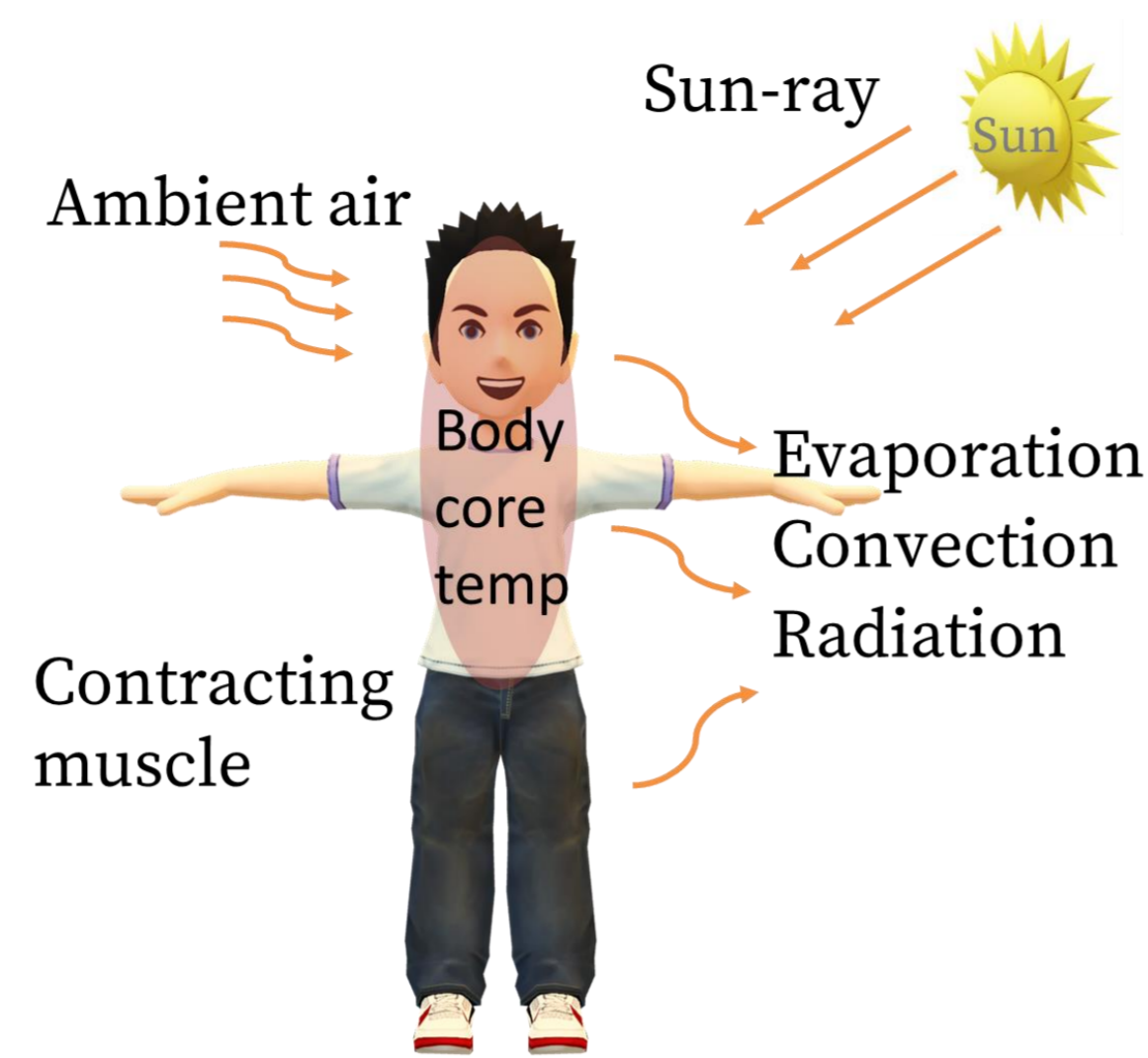
Institute of Technology of Cambodia, National University of Singapore, The Hong Kong Polytechnic University

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Background

Global temperature rise due to climate change might make the phenomenon of "heat stress" causing in the loss of the total number of working hours.

Heat stress depends radiation, air velocity, ambient temperature, relative humidity, clothing, body core temperature, human's activities.



Heat Strain Symptom

- | | |
|-------------------------|-------------------------------|
| Faint or dizzy | Throbbing headache |
| Excessive sweating | No sweating |
| Cool, pale, clammy skin | Body temperature above 39.5°C |
| Nausea or vomiting | Red, hot, dry skin |
| Rapid, weak pulse | Nausea or vomiting |
| | Rapid, strong pulse |

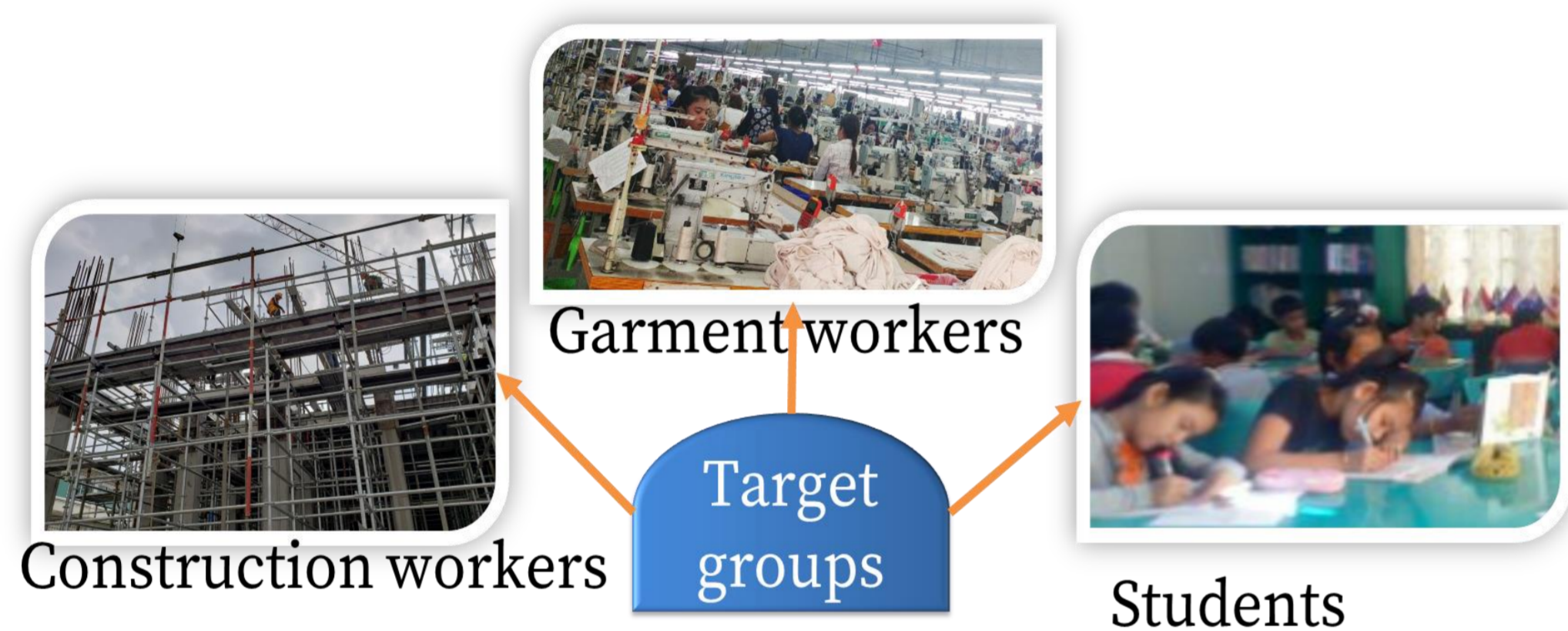
- | | |
|---------------|------------------------|
| Muscle cramps | May lose consciousness |
|---------------|------------------------|

Heat Exhaustion Heat Stroke

Heat stress causes heat strain including heat exhaustion or heat stroke.

When workers work under the heat stress condition, they could:

- slow down the work
- take more or longer break time
- limit the number of worker hours
- which all could contribute to the loss of productivity



To improve productivity and prevent productivity losses in three sectors including construction, garment, and education sectors, expected results from this research will be presented to the ministries for policy planning, and proposed solution to make the surrounding environment cooler.

Objectives

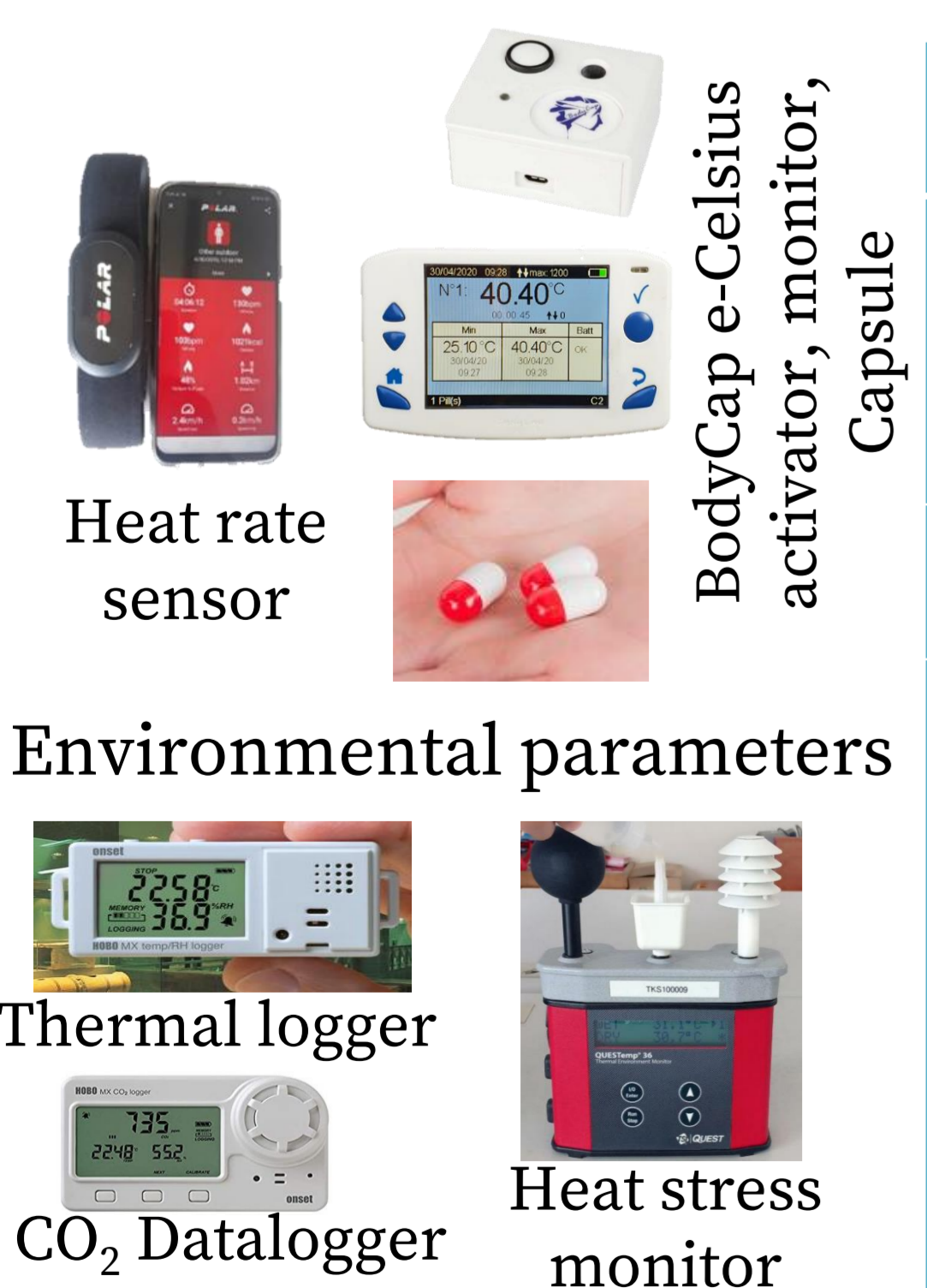
Overall goal of the study is prevent economic loss for policy planning and increase human resources in this research field in Cambodia.

- Build human resources in the heat stress field;
- Investigate the impacts of heat stress on productivity;
- Develop economic model on impact of heat stress; and
- Build evidence on the impacts of heat stress on productivity in three selected sectors including the construction, garment, and education sectors.

Key technologies and approaches introduced

Physiological Parameters

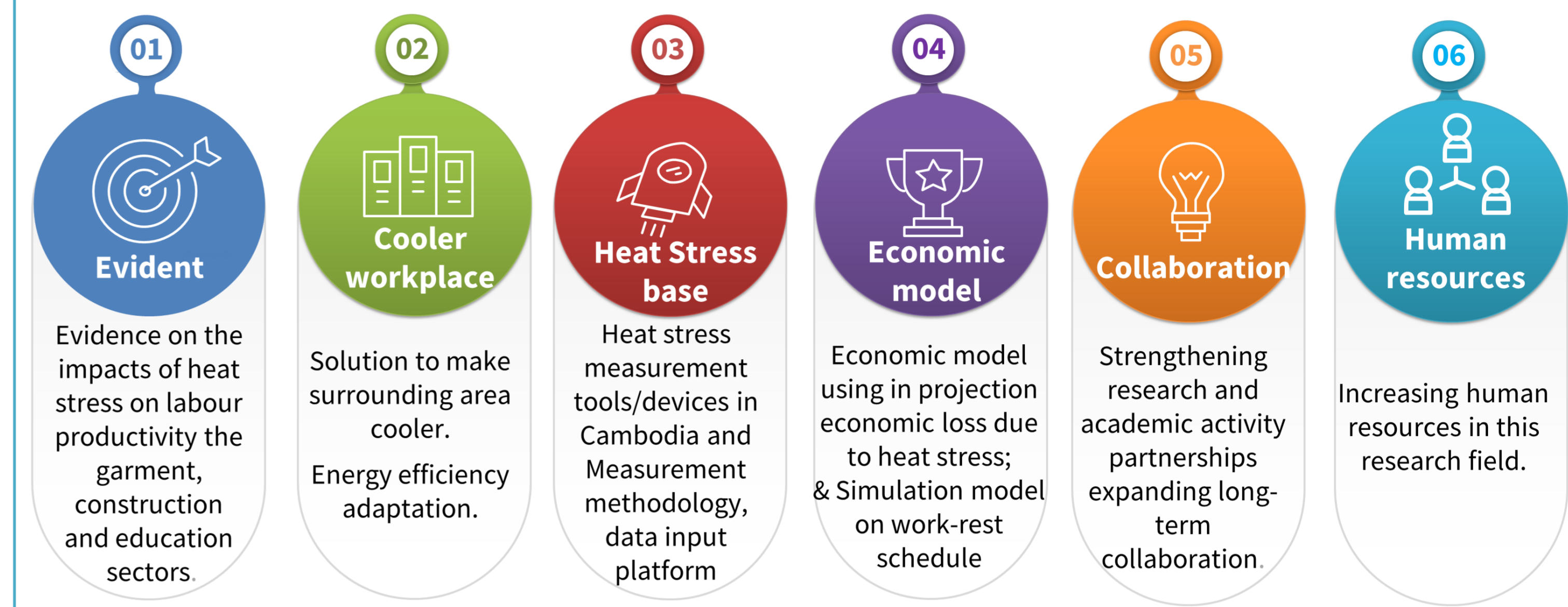
Questionnaire and measurement survey



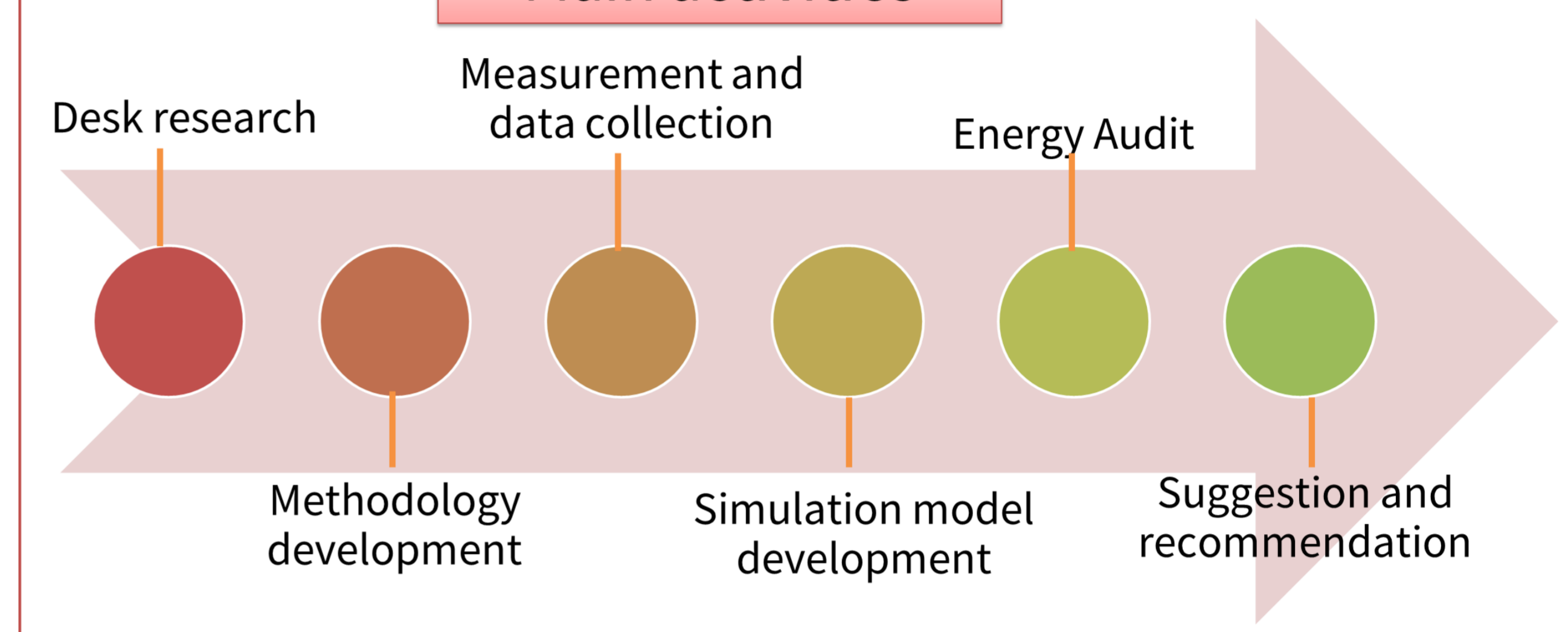
	Garment sector	Construction sector	Education sector
Sampling number	2 factories 250 participants	2 c sites 36 participants 2 times per year	2 schools Boys and girls
Criteria	Sewing dept.	Rebar worker	No air conditioner
Duration	1 year for weather condition record		
	Production volume	8 hrs per day 1 day per 1 participant	
	Defected project Absent number		
	April- May, and Nov-Dec		April- May

Outputs and key activities

Expected outputs



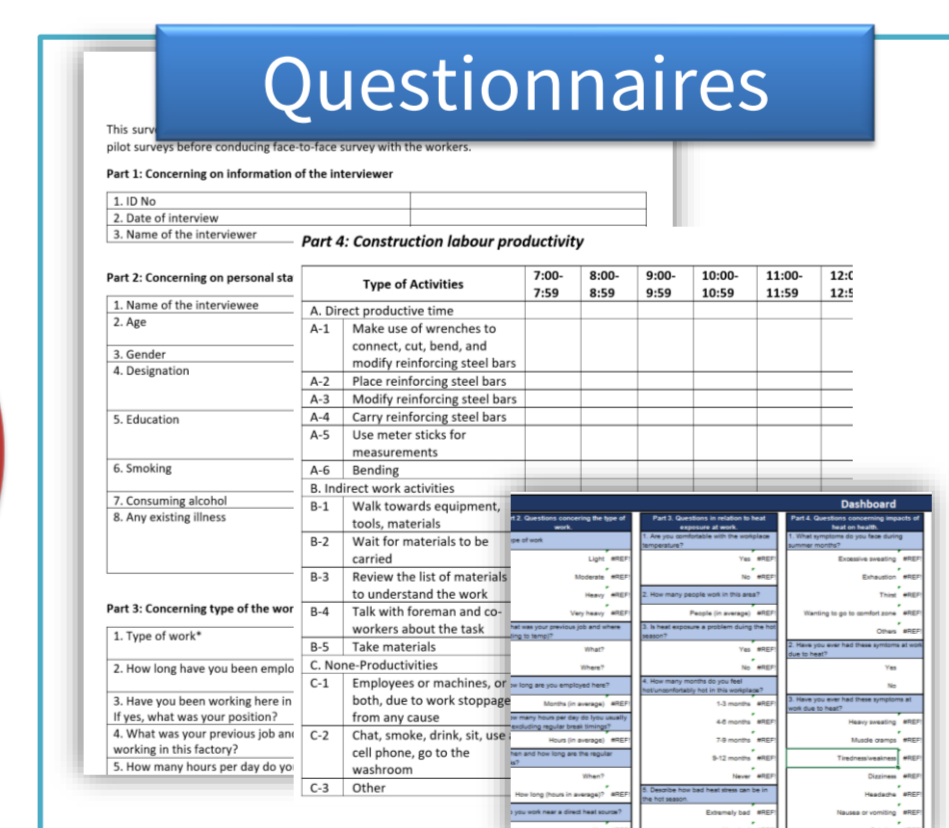
Main activities



Implementation progress



Process	Result	Supporting Documents	Applications Evaluation Method
Advertisement	0 applications received. 0 applications received 3 applications received	• Copy of announcement website • Copy of innsp Application Lis	Application evaluation criteria (PHD applicant evaluation form)
Final list	3 applicants	• Attendant of ir	• Completion of submission documents 1. Motivation letter 2. Recommendation letter 3. Self CV 4. Transcript (Master and Bachelor) 5. English certificate 6. Experiences and background 7. Background on engineering, statistics, environment (SI) 8. Experience on heat stress research, heat cooling, using measurement tools, use sun-logger concentration (SI)
Interview	2 recommended	• Interview rate	• GPA 1. GPA > 3 (SI) 2. GPA > 3 (SI) 3. Proposed qualification 4. Introduction (SI) 5. Methodology (SI) 6. Interview (SI) 7. Interview (SI) Based on the answer during interview
PHD Scholarship evaluation	1 awarded	• PHD scholarship evaluation rep • PHD applicant evaluation form	



Key challenges and lessons learnt

Challenges	Lesson learnt
Closed school	Virtual event
Limitation to access the worksites	Postpone the activities
Purchase of equipment and procurement	Re-arrange the timeline
Financial management	
Scholarship without allowance causing less interesting	



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