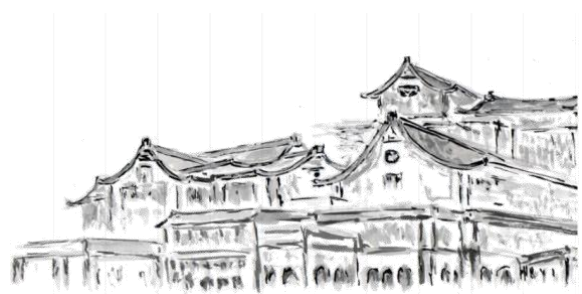




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Promoting Vegetarian Lifestyles with the Usage of Recyclable Dinnerware to Lessen Negative Impacts on the Environment
 Taichung Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation

GGHH Agenda Goals

- Food

Hospital Goal

- Reduce carbon dioxide emissions

Progress Achieved

- Since the opening of vegetarian food court in 2010, there were eight different restaurants provide varied cuisine styles to the public. The restaurant received “Food Safety” recognition in 2014 and is periodically screened through ISO-22000/HACCP. Moreover, Local Health Department has awarded “Certificate of Self-disciplined Good Hygienic Practice (GHP)”
- In the past five years, from 2010 – 2014, by serving vegetarian food selection for 1,943,000 person – times (cafeteria monthly income divided by 50 NT (Food Court Employee) and 70 NT (Cafeteria Employee) we were able to reduce our carbon dioxide emission by 1,516 metric tons through decline in consumption. An additional reduction of 271 metric tons of CO₂ is acquired by none utilization of disposal chopstick which are incinerated after disposal. Please see Table 1.0 to see data for computing person time and carbon emission reduction. The sample computation follows the table below.

Table 1.0 Carbon Emission Reduction

	Cafeteria Employee	Cafeteria Employee	Food Court Employee	Food Court Employee	Total
Year	Person	Carbon Emission Reduction (tons)	Person	Carbon Emission Reduction (tons)	Carbon Emission Reduction (tons)
2010	359699	281			281
2011	368945	288	7865	6	294
2012	424414	331	176036	137	468

2013	355635	277	267770	209	486
2014	434530	339	316918	247	586
Total	1943223	1516	768588	599	2115

Sample Computation:

Givens:

1. Conversion Equivalent of per Kg of CO₂ for every per Kg of Meat

Adult Taiwanese Average Meat Consumption			
	Red Meat	Poultry	Seafood
Kg of CO₂ Generated per Kg of Meat Product	19.7 Kg CO ₂	4.3 Kg CO ₂	8.5 Kg CO ₂
Adult Taiwanese Average Meat Consumption per Meal	58%	18%	24%

2. An adult Taiwanese daily meat consumption is 0.153kg/day; each meal is at 0.051kg/day (0.153kg divided by 3)
3. In terms of protein content every Kg of meat is equal to 0.57 Kg of soy
4. Protein Content per serving of meat and soybean
 - 1 serving of protein is 7g
 - 7g of protein = 35g of meat
 - 7g of protein = 20g of soybean
5. Generated Kg CO₂ of soy bean production is equal to 0.92 Kg CO₂/ 1Kg of product (Oversea by boat)

*References: Carlsson – Kanyame and Gonzalez, Am J Clin Nutr (2009)
Taiwan’s National Nutrition Survey (2005 – 2009)

Sample Computation:

1. Generated Kg of CO₂ for every Kg of Meat

Type of Meat	Generated Kg of CO ₂ per Kg of Meat	Applied Mathematical Operation (Multiplication)	Average Meat Consumption Percentage of Adult Taiwanese per Meal	Generated Kg of CO ₂ based on Percentage of Meat Consumption
Red Meat	19.7	*	0.58	= 11.426
Poultry	4.3	*	0.18	= 0.774
Seafood	8.5	*	0.24	= 2.040
Total				= 14.240

2. Equivalent Kg of soy bean for every Kg of Meat per serving of protein (7g)

➤ Ratio of soybean to meat in terms of protein content

Variable Computed	Grams of Soybean needed to acquire 7g of Protein	Applied Mathematical Operation (Division)	Grams of Meat needed to acquire 7g of Protein	Soybean – Meat Ratio
Ratio of Soybean to Meat	20	÷	35	= 0.5714285

➤ Kg equivalent of soybean per Kg of meat

Variable Computed	Kg of Meat	Applied Mathematical Operation (Multiplication)	Soy bean – Meat Ratio	Kg equivalent of Soybean to 1 Kg of Meat
Kg equivalent of Soybean for every 1Kg of Meat to have same amount of protein	1	*	0.57	= 0.57

3. Generated Kg of CO₂ for every serving of soy bean based on 7g of protein

Variable Computed	Kg of CO₂ produced per 1Kg of Soybean	Applied Mathematical Operation (Multiplication)	Kg equivalent of Soybean to 1 Kg of Meat	Generated Kg CO₂ of soybean to have same amount of protein as with 1Kg of Meat
Generated Kg CO ₂ of soybean to have same amount of protein as with 1 Kg of Meat	0.92	*	0.57	= 0.52

4. Ratio of Generated KgCO₂ of Soy bean for every Kg of Meat (Red Meat, Poultry, Seafood)

Type of Meat	Generated KgCO ₂ of Soybean equivalent to 1 Kg of Meat	Applied Mathematical Operation (Multiplication)	Ratio of Type of Meat for every 1Kg of Meat based on Adult Taiwanese Consumption per meal	Generated KgCO ₂ based from Meat Type per 1 Kg of Meat Ratio
Red Meat	0.52	*	0.58	0.3016
Poultry	0.52	*	0.18	0.0936
Seafood	0.52	*	0.24	0.1248

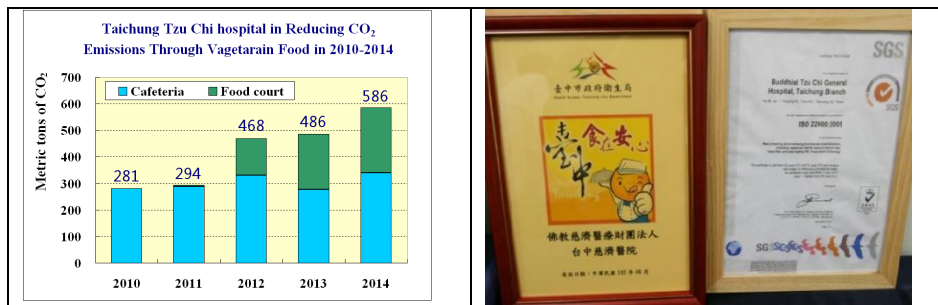
5. Carbon Emission Impact of 1 Kg of meat (Red Meat, Poultry and Seafood) in contrast to equivalent Kg of soybean

Type of Meat	CO ₂ generated per 1Kg of Meat	Applied Mathematical Operation (Subtraction)	Generated KgCO ₂ of Soybean equivalent to 1 Kg of Meat	Carbon Emission Impact
Red Meat	11.426	-	0.3016	= 11.1244
Poultry	0.774	-	0.0936	= 0.6804
Seafood	2.040	-	0.1248	= 1.9152
Net Carbon Emission Impact				= 13.72

6. Generated Kg CO₂ per meal based Net Carbon Emission Impact of 1 Kg of Meat

Net Carbon Emission Impact	Applied Mathematical Operation (Multiplication)	Average Taiwanese Adult Meat Consumption	Kg CO ₂ /meal/ day
13.7	*	0.051	0.6987 KgCO ₂ /meal/ day

- It has been estimated that employees have increased orders for vegetarian meals by 22.8%. In 2013 only 355,653 vegetarian meals were served. However, it has rose to 434,530 vegetarian meals in 2014. Only 67% of the in-patient orders vegetarian meals in 2013 but figures have increased to 81% in 2014 (percentages presented is based on a four - years average).
- In Taichung Tzu Chi Hospital employee's satisfactions increased by 12% from 2014-2015. In 2014, satisfaction rate is at 76% but has increased to 88% in 2015 after the hospital's kitchen served vegetarian meals instead of having it catered



Superintendent Dr. Sou-Hsin Chien and doctors working at the hospital are cooking vegetarian meals to serve the volunteers and show appreciation for their work.

The Issue

- Greenpeace International's report indicated that 1 kg of meat indirectly produces 13 kg of carbon dioxide emission.
- Taiwan's dining out population uses around 10 million disposable chopsticks yearly. Disposable chopsticks are not only toxic when chemicals are ingested; they are also a huge burden for our environment after being incinerated.

Sustainability Strategy Implemented

Taichung Tzu Chi Hospital values holistic approach when it comes to patient care and environment. In promoting vegetarian lifestyles and usage of recyclable dinnerware to lessen negative impacts on environment the following strategies were undertaken:

- Information, Education and Communication Campaigns (IEC)
 - Nutritionist from the Hospital organizes monthly health talks at the hospital lobby and local communities to promote vegetarianism. Participants are being educated on healthy diet and benefits of being vegetarians.

- Employees of the hospital are encouraged to participate in harvesting vegetables and crops from the hospital's farm. In turn they are taught how to prepare vegetarian delicacies and were given references for the recipes.
- Upholding the core principle of vegetarianism which is "safety and health", healthy low fat diets meals are planned and made with locally sourced produce
- The hospital has a farm where organic vegetables and crops were planted. Fertilizers used to enhance growth and nutrients of the crops come from fermented herbs which are also organic.

Implementation Process

1. Taichung Tzu Chi hospital collaborated with restaurants to set up different vegetarian booths in the food court. Reusable dinnerware was cleaned with an 80 degree Celsius disinfecting process.
2. Through hospital's announcement employees were encouraged to bring their own dinnerware. Leftovers were also collected for composting.
3. The food court service received SGS (Societe Generale de Surveillance) and HACCP (Hazard Analysis and Critical Control Point System) certification. The accreditation is being managed by hospital's Catering Safety and Hygiene Management. Vegetarian nutrition classes were provided monthly to employees to promote healthy lifestyles.

Tracking Progress

Taichung Tzu Chi Hospital values the satisfaction of patients and employees. Often, the basis of their satisfaction in terms hospital meals is determined through the quality of service. This is gauged and observed through a survey conducted using a questionnaire which 85% - 90% of the employees responds to. The questionnaire includes criteria for menu design, quality and variety of meal.

Challenges and Lessons Learned

In the past, hospital outsourced their meal services to local businesses. However, to increase revenue, businesses often sacrifice meal quality to cut down cost. Over the years, customer's satisfaction and number of meal orders have decreased. Subsequently, customers started ordering meat-containing meals from nearby businesses. This situation has led to difficulty in cutting down CO₂ emission. To satisfy diverse tastes and medical needs of customers as well as elevating the quality of vegetarian meals, we ceased outsourcing soon after the contract expired and began operating the restaurant on our own through the Diet and Nutrition Department.

Next Steps

Taichung Tzu Chi Hospital acknowledges that there is still room for improvement. We may still further enhance meal quality and variety. In terms of structure service

área may be expanded.

We also hope to continually reduce the amount of CO2 production from animal consumption by replacing traditional meals with vegetarian meals.

Demographic information

Taichung Tzu Chi Hospital is located in Tanzi District of Taichung city, spanning over 184,921 square-meters and holds a 1081 beds capacity, with a staff number of more than 1,500. We provide holistic care and preventive medicine through community medicine, home visits and health counseling. Since the beginning, we opted for local construction materials to protect the ecosystem and prevent land erosion.

Links

<http://taichung.tzuchi.com.tw/w/?id=1581>

Quotes:

“Adequate nutrition is a basic need. Adequate nutrition access is a basic human right. In Taichung Tzu Chi Hospital, we hope to serve nutritious and delicious vegetarian meals / plant-based diet for our patients and staff. Since 2014, catering services were outsourced to different restaurants providing variety food options and they were all well-received. We believe a guided vegetarian diet will give good nutrition to stay healthy and to promote environmental health.” -
Mr Chung-Wei Yang, Chief of Nutrition Service Department”

Keywords / Topics:

Food Safety, vegetarian meals, recyclable dinnerware, carbon dioxide emissions

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