

# Smartvillage - Towards Sustainable Development

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**Abstract:** Traditional agricultural activities in Indonesia can play a significant part in sustainable development. A key challenge faced is the trend towards urban concentration, which reduces this potential due to the reduction in agricultural support as individuals relocate to the main cities. This paper explores the concept of ‘Smartvillages’, which involves bringing farming development and IT development activities together to enable outcomes that achieve economic growth through sustainable practices whilst helping to address climate change.

**Keywords:** Sustainable development, climate change, Smartvillage, Indonesia, Information Technology

## 1. INTRODUCTION

Rural areas in Indonesia are abundant in natural resources, which can help support a sustainable livelihood; however, job prospects have led many individuals to relocate from rural areas to pursue industrial and factory work in cities.

Indonesia’s cities are growing, faster than any other Asian country, at a rate of 4.1% per year. Increasing urbanisation is expected to boost economic growth, but this is hampered by underinvestment in infrastructure, which has caused congestion, pollution and disaster risks<sup>1</sup>.

<sup>1</sup> <http://www.worldbank.org/en/news/feature/2016/06/14/indonesia-urban-story>

In order to create sustainable livelihood, individuals need to be able to gain a better return from their produce through better customer market access and reduction of supply chain costs.

This paper explores the development of 'Smartvillages' across Indonesia, which are communities with diverse IT development and farming skills that co-mingle to enable productivity in a sustainable manner.

In contrast, farmers have more difficulty in servicing global (and some local) customers due to logistical challenges and costs in relation to the transportation and fulfillment of physical goods.

The development of Smartvillages is expected to improve the situation over time through the following:

- IT developers in the areas increasing their purchase and consumption of the farmers' produce.
- Increasing economic activity and focus in the area can improve infrastructure and logistics leading to better access to the global marketplace for farmers.
- The blend of modern and traditional facilities can create tourism opportunities.
- Overall, these activities will help uplift Indonesia's IT capabilities with advanced nations, but also significantly assist with climate change mitigation efforts.

This paper draws on specific examples that the author has been involved in over the past 14 years working with the Indonesian and Australian government on activities that help to drive a green economy and respond effectively to climate change.

#### 4.1. The "Smartvillage" Pilot

In 2003, after the author set up his company in 2002, Wirasoft Consulting, he built a "pilot" Smartvillage in Semarang, Central Java Indonesia as depicted in Figure 1.



Figure 1 Smartvillage in Semarang, Central Java, Indonesia

Due to limited funding and support, the pilot did not launch until 2012 after it gained support from the Indonesian Diaspora Network (IDN) led by Dr. Dino Patti Djalal, former Indonesian Ambassador to the United States. IDN focuses on empowering Indonesian communities through better and support.

#### 4.2. The first "Smartvillage"

The first Kampung IT<sup>2</sup> or Smartvillage was established in 2017 in Kediri, East Java successfully with the support of many including the following individuals and organisations:

- Mayor of Kediri (Mr. Abdullah Abu Bakar, KADIN)
- The Indonesian business chambers and associations in Kediri
- The PGRI University of Kediri<sup>3</sup>
- The Polytechnic of Kediri<sup>4</sup>
- Bank of Indonesia (BI) branch of Kediri, Bank Jatim Branch of Kediri
- The business people of Kediri.

The event has been promoted and organized by SANYURI<sup>5</sup> Indonesia (a social organization).

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[https://translate.google.com/translate?hl=en&sl=id&tl=en&u=http%3A%2F%2Fm.beritajatim.com%2Fberita\\_kediri%2F313385%2Fwalikota\\_kediri\\_launching\\_kampung\\_it%2C\\_satu-satunya\\_di\\_indonesia.html&sandbox=1](https://translate.google.com/translate?hl=en&sl=id&tl=en&u=http%3A%2F%2Fm.beritajatim.com%2Fberita_kediri%2F313385%2Fwalikota_kediri_launching_kampung_it%2C_satu-satunya_di_indonesia.html&sandbox=1)

3 <https://www.4icu.org/reviews/universities-english/14179.html>

4 <http://poltek-kediri.ac.id/>

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<https://translate.google.com/translate?hl=en&sl=id&tl=en&u=https%3A%2F%2Fsites.google.com%2Fa%2Fsanyuri.com%2Fwww%2Ftentang-kita%2Fsejarah-sanyuri&sandbox=>





**Figure 2 The Launching of Kampung IT (Smartvillage) in Kediri, East Java**

The above Figure 2 shows the Kediri Mayor Abdullah Abu Bakar opening the Launch of Kampung IT Kota Kediri and the Java Programming Workshop at Kediri Polytechnic 1 Campus, Monday (13/11/2017).

This program was the first of its kind in Indonesia. "I am very happy and very supportive of this program to implement IT village," said Abdullah Abu Bakar on the occasion. He hopes this program will continue and can increase the competence of programmers especially in Kediri.

"All have been using IT technology. In Kediri City is now using online-based services such as the Voice of Citizens of Kediri (Heaven), about the administration of population, online licensing, UN online, etc. My hope with the IT program is at least the service to the community IT-based ones can be simplified" he added.

The event was attended by the Chairman of Kadin of Kediri-HM. Sholikin, representatives from BI branch Kediri, Bank Jatim Branch Kediri, Chairman of Sanyuri Kota Kediri - Drs. Setyohadi, representative of Diskominfo-Haris Candra Purnam, Director of Polytechnic of Kediri-Drs, Rector of UNP campus, Cahaya Surya, STIMIK, UNIK, and followed by 24 participants including lecturers, students and alumni of Poltek and general public.



**Figure 3 Kampung IT (Smartvillage) Workshop in Kediri, East Java**

The two (2) week workshop as depicted in Figure 3 above was held in two (2) sessions. The first on 13-17 November 2017 in Polytech of Kediri and the second was held on 20-25 November 2017 in UNP University of Kediri<sup>6</sup>. In addition, a MoU between Polytech of Kediri and Wirasoft was signed.



**Figure 4 IT Services and Education in Kampung IT (Smartvillage) Kediri, East Java**

As a result of the workshop depicted in Figure 4, Kampung IT (Smartvillage) at Kediri are currently in the position to offer further advanced ICT education as well as IT services to the local communities, government and businesses.



**Figure 5 The Mayor of Kediri won the main award of the Smart Indonesia City Rating 2017**

As depicted in Figure 5, one month after the success of launching Kampung IT, the Mayor of Kediri, Abdullah Abu Bakar

<sup>6</sup> <https://www.4icu.org/reviews/universities-english/14179.html>

receives the main award of the Smart Indonesia City Rating 2017 from the Vice President of Indonesia, Jusuf Kalla at the vice president's palace on Monday (11/12/2017).

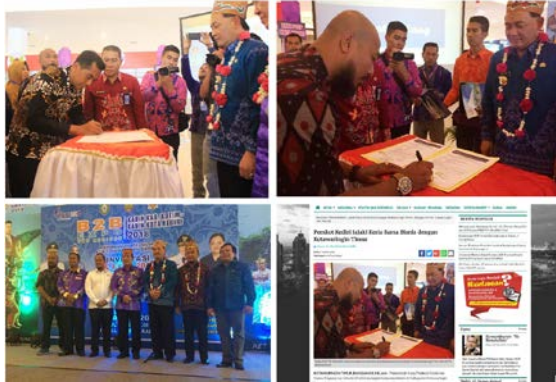


Figure 6 The signing of MoU

The Figure 6 above shows the Municipal Government of Kediri and the Chamber of Commerce and Industry (KADIN) is exploring business cooperation in Sampit, Central Kalimantan.

Due to the success of the Smartvillage project in Kediri, East Java last year and Smartvillage in Sampit, Central of Kalimantan early this year, we will continue our efforts to set up the third Smartvillage in Alamendah, West Java in collaboration with Dr. Ida Widianingsih from UNPAD<sup>7</sup> university, Rudolf Wirawan from Wirasoft<sup>8</sup>, Prof. Janet McIntyre from Flinders<sup>9</sup> University as well as Prof Norma Romm from the University of South Africa (UNISA<sup>10</sup>).

#### 4.3. UNPAD International Symposium 2017

In December 2017 the university of UNPAD has conducted an International Symposium about the Mixed Methods.



Figure 7 International Symposium at UNPAD, West Java on 15-18 December 2017

Figure 7 above shows the International Symposium at UNPAD, West Java on 15-18 December 2017.



Figure 8 Local villagers at Alamendah, West Java with Kampung IT

As shown in Figure 8 above, after the symposium, we visited Alamendah village in West Java and discuss with the villages about setting up Kampung IT (Smartvillage) in Alamendah in collaboration with UNPAD, Wirasoft, UNISA and Flinders and have been inspired by the potential for empowering local villagers.

During the symposium, in conjunction to Smartvillage in Indonesia, Profs. Norma Romm and Janet McIntyre planned to set up Kampung IT in South Africa as well through developing international collaboration to start regional development hubs.

#### 4.4. Global Kampung IT

The idea of setting up Kampung IT in South Africa has sparked the idea to set up global Kampung IT in collaboration with the Indonesian Government and the related

<sup>7</sup> <http://unpad.ac.id/>

<sup>8</sup> <http://wirasoft.com.au/>

<sup>9</sup> <https://www.flinders.edu.au/>

<sup>10</sup> <https://www.unisa.ac.za/sites/corporate/default>



country wanting to setup Kampung IT in their villages.

The Global Kampung IT will be a joint effort between universities lead by Prof Janet McIntyre from Flinders university, Prof Norma Romm from UNISA (University of South Africa), Prof Ida Widianingsih from UNPAD (Universitas Padjajaran in Indonesia) and Rudolf Wirawan from Wirasoft Pty Ltd, an Australian company located in Sydney.

In Global Kampung IT, we are setting up Kampung IT in Indonesia, Australia, South Africa and hopefully in Vietnam as well.

## 2. GIVING BACK TO THE COMMUNITY

### 2.1. Raising The Profile of IDN and Initiatives

Since the establishment of the first Indonesian Diaspora Network organisation in 2013 in Australia, the author has been actively supporting the organisation and served as the President of the Indonesian Diaspora Network (IDN) in the state of New South Wales (NSW), Australia until 2017 and due to many tangible results have been achieved in Australia and Indonesia, the author has been elected globally as the Vice President for Australia and Oceania from 2015 until 2017.

The results have been documented in the Indonesian Diaspora in Australia Annual General Meeting 2017<sup>11</sup> "Australian Diaspora in Action. Not Just Empty Promise (Diaspora Australia Beraksi Bukan Sekedar Berjanji)".

As the President of Diaspora in NSW, the author has achieved in promoting Australia to Indonesia, for example the Smart Cattle Tracking System (SCTS), developed by Wirasoft in Australia in response to the call by the former President of Indonesia, Dr Susilo Bambang Yudhoyono for the Indonesian Meat Self sufficiency.

SCTS is currently under discussion to be further developed in Kampung IT

Kediri under the supervisor of Prof Muladno<sup>12</sup>, Professor of Animal Breeding and Genetics at Bogor Agricultural Institute (IPB) to manage the strategic policy in the construction of 54 People Ranch Schools as depicted in Figure 9 below.



Figure 9 Prof Muladno and Rudolf at the launching of the People Ranch School in East Java

### 2.2. Joint Research With Flinders University

Partnership with Flinders University and the works of Prof Janet McIntyre from Flinders has led to the following joint research papers being published by Springer Publisher:

- Pathways to Wellbeing<sup>13</sup>: Low Carbon Challenge to Live Virtuously and Well: Participatory Design and Education on Mitigation, Adaptation, Governance and Accountability
- Balancing Individualism and Collectivism<sup>14</sup>: Social and Environmental Justice

The above papers focus on specific strategies to improve social and environmental outcomes. The strategies and principles highlighted in the papers are

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<http://wirasoftfoundation.org/documents/106406/0/Diaspora+Australia+Beraksi+Bukan+Sekedar+Berjanji+2013-2017+v2.0.pdf/33a216b3-6a5f-45eb-a289-b27e5c9bab62>

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<https://ipb.ac.id/news/index/2016/07/prof-muladno-is-back-to-be-active-in-ipb/9ebaa47c5c319cec740c17d5c75c09c6>

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[https://link.springer.com/chapter/10.1007%2F978-3-319-58014-2\\_3](https://link.springer.com/chapter/10.1007%2F978-3-319-58014-2_3)

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<https://link.springer.com/book/10.1007/978-3-319-58014-2>

being applied to the Smart Villages in Indonesia and will also be applied in the establishment of Smart Villages in other countries.

### 2.3. Uniqueness of Indonesian Coffee

Indonesia, also known as Nusantara is a contemporary Indonesian term for the Indonesian archipelago. It originated in Old Javanese and literally means "archipelago", was the fourth largest producer of coffee in the world since 2014.

#### 2.3.1. Diverse Taste of Indonesian Coffee

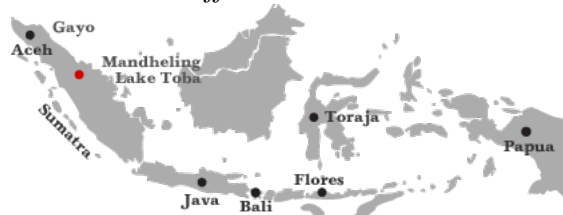


Figure 10 Indonesian Coffee Map (Source: Quintino's Coffee)<sup>15</sup>

As depicted in the Fig.10, coffee in Indonesia begun with its colonial history, when the Dutch governor in Malabar (India) sent a Yemeni or Arabica coffee (*Coffea Arabica*) seedling to the Dutch governor of Batavia (now Jakarta) in 1696, and play an important part in the growth of the country.

Indonesia is located with an ideal geography for coffee plantations, near the equator and with numerous mountain regions across the islands, creating well suited micro climate for the growth and production of coffee.

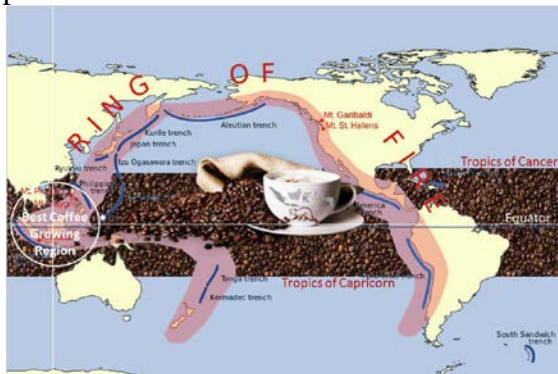


Figure 11 The Ring of Fire and the Bean Belt crossing only in Indonesia

#### 2.3.2. The Ring of Fire

Surrounding by the Ring of Fire (Fig.11), Indonesia's 3,200-mile (ca 5,150Km) archipelago with 17,000 islands, 120 active volcanoes, ample rainfall, fertile soil, and ideal temperatures have led to the existence of a variety of coffees.

A coffee plant prefers rich soil and mild temperatures, with lots of rain and shaded sun. It grows best in a band around the middle of the world, bounded by the Tropics of Capricorn and Cancer, known as the Bean Belt. Soil, climate and altitude affect the flavour of the beans. Indonesia is the only country in the world that is crossed between the Ring of Fire and the Bean Belt. Therefore Indonesian's coffee has a very unique taste.

Specialty Arabica coffee is Indonesia's most popularly exported product and has gained worldwide acknowledgment. This has positioned Indonesia as the 2nd largest specialty Arabica exporter in the world, with 150,000 tons of export per year. Nearly 100 genetic varieties of Arabica coffee have been created since 1699 - some of these include Sumatra Lintong, Sumatra Kerinci, Sumatra Solok Minang, Java Preanger, Java Ijen Raung, Java Estate, Sulawesi Toraja, Papua Wamena and much more.

Indonesian coffee is all about a journey of exploring and discovering the diverse taste of coffee that the Indonesian archipelago has to offer. Therefore with coffee, bamboo and cassava, we can link them to tourism, culinary and culture of over 300 ethnic groups in Indonesia, which are mostly living in the rural area in harmony.

#### 2.3.3. Indonesian Coffee

The author has promoted Indonesian coffee with the assistant of the Consulate General of the Republic of Indonesia in New South Wales, Dr. Yayan Ganda Hayat Mulyana<sup>16</sup> and the Indonesian Trade promotion Centre (ITPC), led by Mr.

<sup>15</sup> <https://www.quintinos-coffee.com/coffee-guide/>

<sup>16</sup> <https://australiaindonesiacentre.org/people/yayan-mulyana/>

Agung Haris Setiawan<sup>17</sup>, the ITPC Director.

With the help of Australian and Indonesian Coffee Association (AICA) led by Mr. Toni Marci<sup>18</sup>, a Coffee Q Grader certified under Specialty Coffee Association of America, beans originating from West Java were entered into the Melbourne International Coffee Expo ("MICE") roasting competition in March 2017. The West Java Coffee Filter Blend won a Bronze Medal in the "Single Origin Pour Over". This is hopefully the beginning of promoting Indonesian Coffee on an International stage.

#### 2.4. Bamboo, The Miracle Plant

Bamboo plays a central role in Indonesia's climate change mitigation efforts. The country is strengthening the capacity of local communities so they can get the most from this valuable resource.

##### 2.4.1. Bamboo Building

The picture below (Fig.12) depicted one of many Cafes made from bamboo material for people to meet, while enjoying local culinary and high quality coffee bean found all over Indonesia with free Wi-Fi and free electricity.



Figure 12 Bamboo Cafe, West Java<sup>19</sup>

##### 2.4.2. Bamboo Gasification

The following diagram depicted the production of electricity in collaboration between the local communities participation in growing and supplying bamboos to the local independent power

producer, which can be found in Mentawai Island<sup>20</sup>, since 2015.



Figure 13 Green Energy Cycle through collaboration

The Mentawai Islands are a chain of about seventy islands and islets approximately 150 kilometres off the western coast of Sumatra in Indonesia. Siberut at 4,030 square kilometres is the largest of the islands and they produce electricity (Fig. 13) by means of "Gotong Royong (collaboration)". This is a concept of sociality familiar to large part of Indonesia as members of a community in collaboration to achieve a common goal.



Figure 14 Bamboo Gasification

The local independent power producer then turning bamboo by means of gasification (Figure 14) into electricity and selling it to the energy company, so they can supply electricity to the contributor of the related local community with the subsidised tariff.

#### 2.5. Bamboo Music with Angklung

In addition to the above mentioned benefit of bamboo for the environment, the best of all is bamboo can also be crafted to become music instruments. For example Angklung in Indonesia can be used to convey peace and harmony. In Vietnam Đàn T ' Rung is a traditional bamboo xylophone used as traditional music

<sup>17</sup> <https://www.itpcsydney.com/cebit2017/>

<sup>18</sup> <http://coffebros.com.au/tony-s-story>

<sup>19</sup> <http://listofhappiness.com/index.php/2016/09/29/makan-tradisional-ala-sunda-di-kebun-awi-kaffee/>

<sup>20</sup> <https://www.youtube.com/watch?v=mHOsGfUEzks>



ensembles representing the music of the highland minorities in Vietnam.

According to Sundanese elders, Angklung tubes symbolise human life; the tubes themselves being the people. The Angklung could not be the instrument that it is, had it only consisted of one tube. This embodies the fact that humans are "social animals," as said by Aristotle, and that they may not live appropriately in isolation. The large and small tubes that are situated next to each other in each instrument represent an individual's growth and capabilities. Different tube sizes signify the truth that all people have different roles to play to create some kind of peace and harmony in this world.



Figure 15 Bamboo for Peace at the UN

The angklung from Saung Angklung Udjo<sup>21</sup> was first heard inside the UN building in New York on the April 30st 2018 and hundreds of foreign diplomats were amazed to learn and participate in the Indonesian traditional music orchestra (Figure 15).

The concert, titled "Bamboo for Peace: Enchanting Sounds and Rhythms of Indonesia", was organized in collaboration with the Permanent Mission of the Republic of Indonesia to the UN in New York, aiming to increase the intensity of Indonesia candidacy campaign for UN Security Council non-permanent membership for the term 2019-2020<sup>22</sup>.

## 2.6. Cassava for Bio-Degradable Plastic

In addition to bamboo, cassava can also be used to support towards sustainable development by producing biodegradable products called ecoplas instead of oil based

plastic as depicted in Figure 16 below from Greenhope.



Figure 16 Cassava Based Products

Ecoplas is bio-based and degradable plastic made out of certified fair trade cassava, driving positive combined environmental and social impact. Ecoplas has received numerous acknowledgment and awards domestically and internationally as one of the most competitive bio-based materials towards next generation / sustainable green plastic. Greenhope<sup>23</sup> is a green technology company with produce Ecoplas (cassava based plastic).

## 3. GUIDANCE FOR SETTING UP SMARTVILLAGE (KAMPUNG IT)

Further to coffee, cassava and bamboo biomass, the water vertex green energy as found at the Green School's campus in Bali, Indonesia is used to generate electricity energy as depicted in the following Figure 17:



Figure 17 Water Vertex

The Green School in Bali<sup>24</sup> as well as the Yayasan Bambu Indonesia<sup>25</sup> (Bamboo Foundation Indonesia) can be used as a guidance for setting up Smartvillage (Kampung IT) architecture all over Indonesia from Sabang in northern Sumatra to Merauke in Irian Jaya.

<sup>21</sup> <https://angklung-udjo.co.id/>

<sup>22</sup>

<https://translate.google.com/translate?hl=en&sl=id&tl=en&u=https://www.antaranews.com/berita/706155/alunan-angklung-gaungkan-perdamaian-di-markas-pbb>

<sup>23</sup> <http://www.greenhope.co/>

<sup>24</sup> <https://www.greenschool.org/>

<sup>25</sup> <https://www.kemlu.go.id/Majalah/Indoinvites%20II.pdf>





Figure 18 Jatnika's Bamboo House

The Figure 18 depicted one of thousand of bamboo houses developed and build by Mr. Jatnika Nanggamiharja from Bamboo Foundation Indonesia, which have been exported worldwide.

To ensure the adequate supply of bamboo, we are colaborating with the Ministry of Environment and Forestry of Indonesia and Bambu Nusa Verde<sup>26</sup>, a biotechnology company specialized in the micropropagation of bamboo species, to cultivate bamboo in Indonesia as depicted in the Fig. 19 below.



Figure 19 Bamboo Nusa Verde Biotech in Yogyakarta, Central Java

The head office and production facilities are located in Yogyakarta, Indonesia.

## 7. CONCLUSION

There are numerous ways in which greater sustainability can be achieved through starting with greater focus in rural areas and focusing on core sustainable activities that exist today. The examples presented in this paper including sustainable building construction and agriculture practices (including Coffee, Biodegradable plastic) and musical instruments are only a few but compelling examples that highlight opportunities to develop more “Smartvillage” communities and help to address the problem of climate change.

<sup>26</sup> <http://www.bambunusaverde.com/>

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<sup>27</sup> [https://link.springer.com/chapter/10.1007%2F978-3-319-58014-2\\_3](https://link.springer.com/chapter/10.1007%2F978-3-319-58014-2_3)

<sup>28</sup> <https://link.springer.com/book/10.1007/978-3-319-58014-2>

<sup>29</sup> <http://wirasoftfoundation.org/documents/106406/0/Diaspora+Australia+Beraksi+Bukan+Sekedar+Berjanji+2013-2017+v2.0.pdf/33a216b3-6a5f-45eb-a289-b27e5c9bab62>