

Reading sustainability post annexations of Rumah Gadang architecture

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Abstract. Many of Rumah Gadang of Minangkabau in West Sumatra has strived through many years of extreme tropical climate. Through times this type of vernacular house has remarkably endure and stay, hence the increasing numbers of maintenance cost. One family generation to its next, as many other normal family houses may have experienced, the annexation phase (adding spaces) of living is inevitable. As Rumah Gadang design has been considered as one model of eco-tropical architecture fine example, its annexation could make the green compactness of its majestic design changed. This research analyzes major typical modifications and changes that could happen to Rumah Gadang's original design. Field research was conducted direct to its site's origin in West Sumatra. Its actual and recent plans (after annex) are documented to study the basics and its upgrading modification tendencies. This information then could become the base for further research on exploring the local wisdom, its traditional building values, material development and changes, and also its future endurance.

1. Introduction

The effort to make Minangkabau traditional house (Rumah Gadang) sustainable has been done by the people of Minang, following the availability of resources, surrounding nature, and settling characteristic of the society. People of Minangkabau have been trying to achieve a sustainable dwelling design even before the development of technologies that support it. The design development of Rumah Gadang continues to evolve following the needs of its more modern society. Natural resource exploitation has caused negative impacts to the environment following the fast growth of the population which requires more provided land for settlements. The settling characteristic of the society has been evolving which then caused changes of the settlement spatial program. The objectives of the writing are to deepen understandings on Rumah Gadang architecture, its sustainability concepts and the applications after its physical changes, reflected by its spatial and functional changes.

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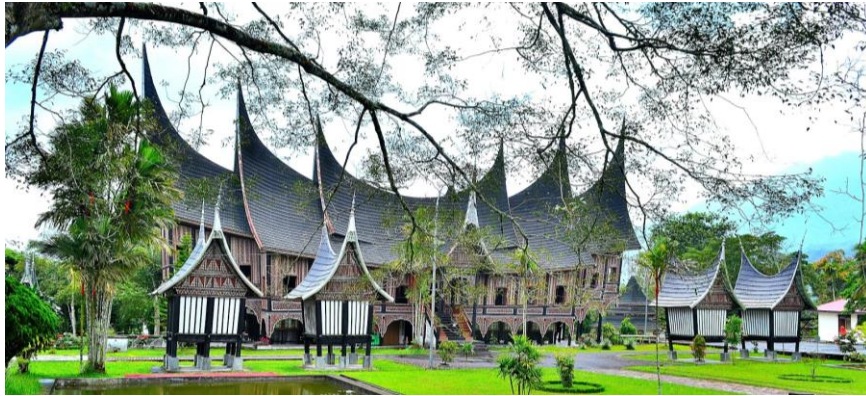


Figure 1. Rumah Gadang of Minangkabau.

<http://putriaulina.blogspot.co.id/2013/03/rumah-gadang-minangkabau.html>

2. Theory of sustainability

2.1. Sustainability

The sustainable architecture approach is used in general to explain a building design which its technology, material, ecology, and environment are all in balance (Attmann, 2010). In context, this approach is divided into three main components: sustainable elements (material and technology), sustainable resource, and sustainable environment.

According to Attmann, sustainable elements consist of material and technology in which fulfil the following aspects: durability, economical, low maintenance, and recyclability. These aspects must exist as parameters in considering the architecture's level of sustainability. On sustainable resource, it refers to the supports how the building works, such as material resource, site potential, accessibility, and the nature response within the environment. This sustainable factor can be achieved whenever these resources are applied effectively to support the physics and the actual functions of the architecture. Sustainable environment is achieved when the surroundings are proven healthy, habitable, responsive to social capacity, and protected physically from faults or mistakes due to and during the development process, and/or private security threats.

2.2. Cultural base of Minangkabau society

Minangkabau people sees nature as a knowledge resource. *Alam takambang jadi guru* (nature developed into teach(ing) – as a teacher), this is a wisdom teaching of the society on how they value their nature (Navis, 1984). This philosophical inheritance goes down to generations within the society. Furthermore, a local people named Taufik explained that there are some rules which cannot be disturb or change as it already stated (by the society), and rule which can be changed base on agreement within the society, as long as it does not in contrary to the firmed and already stated one (interview, Nov 22, 2016).

In connection to Rumah Gadang, anything which rule about its architectural function and elements are stated as law that can be changed (with agreement). Building a traditional house Rumah Gadang nowadays can be modified as long as it does not change its identity. The most important matter is how the house meet the needs of the residents and its function for traditional local custom/practice (*adat*).

3. Post annexation of the original Rumah Gadang

At the beginning, variant of Rumah Gadang are differed from its harmonious style of every society group. According to Navis (1984), it really depends on the leaderships of either *Datuk Katumangguangan* and *Datuk Parpatiah nan Sabatang*. This difference has evolved and make unique of the Rumah Gadang within the territory of Minangkabau. Couto and Darwis (1999) explained the schematic development and changes of Rumah Gadang on their research. This diagram shows the

morphology of the traditional house forms. We assume that based on the society's philosophy of *Alam Takambang Jadi Guru*, that there are applications of sustainable architecture on the very house. Ecological environment has come to their intention relatively in balance with material and technological aspect of sustainability.

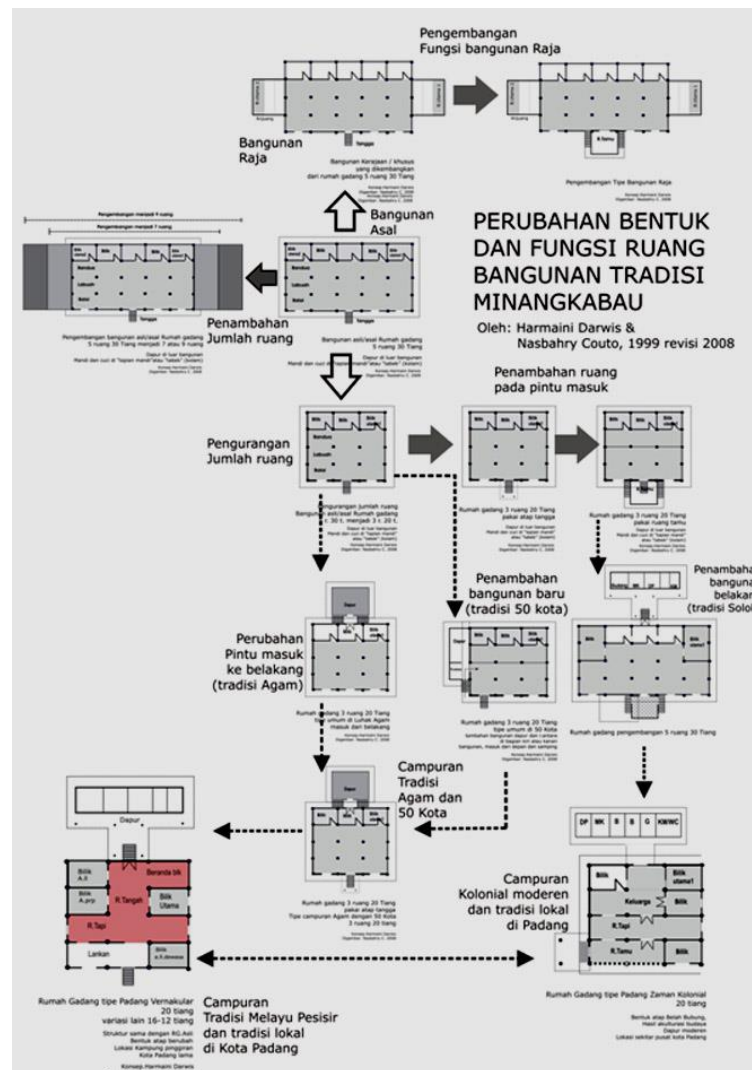


Figure 2. Morphological and functional changes of Rumah Gadang according to Couto and Darwis (in Indonesian).

4. Research method

We tried to find the conceptual practice of sustainability applied to Rumah Gadang, especially the ones that have spatially changed. Changes refer to Couto and Darwis's research outcome as research scope limitation. The actual parameters to reach for sustainability are based on Attmann theory. Case studies research were done to collect data needed for analysis. Two classified houses were chosen based on the changes classification made by Couto and Darwis. The two houses are: *Kaum Datuk Amat Dirajo* House at Batusangkar, and *Kaum Bawah Balai* House, also at Batusangkar. Same locus is arranged for the reason on comparing how the two house response to the similar natural environment around. The two houses were observed to understand the logic of it sustainability shifted changes.

5. Research results

Analysis based on observation and diagrammatic data were done to define the sustainable aspects of Rumah Gadang. The annexations were built according to the current needs, expanding and shifting spatial changes. To some extent the results are still attached to the main house, connected by roofed staircases.

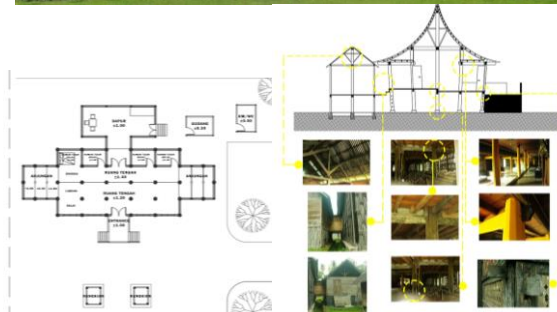


Figure 3. Rumah Gadang Kaum Datuk Amat Dirajo + Annexation. Plan and sustainability aspect approaches analysis.

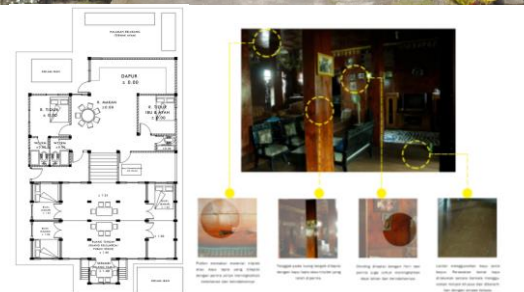


Figure 4. Rumah Gadang Kaum Bawah Balai + Annexation. Plan and sustainability aspect approaches analysis.



Figure 5. Rumah Gadang Kaum Datuk Amat Dirajo + Annexation. Sustainability aspect: Environment, efficiency and its potential site.

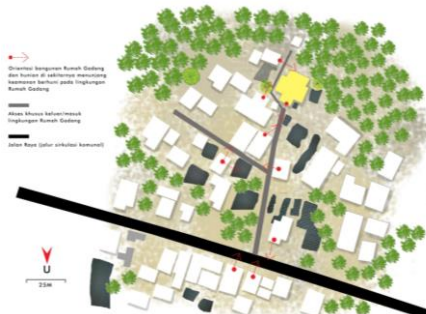


Figure 6. Rumah Gadang Kaum Bawah Balai + Annexation. Sustainability aspect: Environment, efficiency and its potential site.

The natural resources sustainability aspects are mapped diagrammatically to illustrate how the building works. The sun path is drawn to rationalize the logic of natural lighting, as same as the wind directions towards the house. The materials and structures are explained as rare wooden material with ornamental carvings, with finishing. The sustainability aspect of the material would be weakened, depending on the durability of the woods. Replacements are most likely would be differed from the originals. Among those changes, these case houses are the ones that match the classifications from Couto and Darwis, where annexations were taken.

6. Conclusion

The two houses show sustainable architecture aspects inherent to Attmann theory. On Rumah Gadang Kaum Bawah Balai, the requirements for durability, efficiency, economical on maintenance are intact. The annex does not use natural material, which freed the house owner from dependency. In terms of recyclability, the house cannot fully meet the requirement, since the existing original material cannot be replaced by other material resources of the same kind.

The two houses responses to the natural resources and site potential as supporting energy for the inside space of Rumah Gadang. Healthiness and habitable aspects are supported by the durability of the elements and the use of surrounding resources. The houses are nicely responded activities of the residents, which include networking of them within the society. Local customs held using the houses are still meeting the needs occasionally. The only aspect that short is the poor waste management system, in which at the end will affect the cleanliness factor of the environment. After further analysis, the two houses demonstrate the shifted archetypes of Rumah Gadang after annexations, where changes found without jeopardizing the existence of the main house. The philosophical value of the house is maintained with changes on its façade appearances. Its sustainability aspects are in place.

Further empiric research is suggested to calculate the shifted parameters used for its sustainability. This research as a foundation has shown the mapping of sustainable aspects of Rumah Gadang while at the same time put the recent dynamics facing the future of these types after annexation. Models are described in details according to its related sustainability theory. By reading it, we can further read other vernacular houses sustainability, from different ethnic groups in Indonesia or any other countries.

7. References

- [1] Attmann O 2010 *Green Architecture: Advanced Technologies and Materials* (USA: The McGraw-Hill Companies, Inc)
- [2] Bartlett A A 2012 *The Meaning of Sustainability* **31** No 1 pp 1
- [3] Keeler M and Burke B 2009 *Fundamentals of Integrated Design for Sustainable Building* (Chichester: John Wiley and Sons Ltd)
- [4] Kim J 1998 *Sustainable Architecture Module: Introduction to Sustainable Design* (Michigan: National Pollution Prevention Center for Higher Education)
- [5] Nasbahry C 2010 *Morfologi Bentuk Bangunan Tradisi Minangkabau Sebagai Refleksi Budaya*. 26 Juli 2010. Accessed on November 6th, 2016, at 2 PM. <http://visualheritageblog.blogspot.com/2010/12/morfologi-bentuk-bangunan-tradisi.html>
- [6] Navis A A 1984 *Alam Berkembang Jadi Guru*. (Indonesia: Grafiti Pers)
- [7] Syafwandi 1993 *Arsitektur Tradisional Sumatera Barat* (Jakarta: Departemen Pendidikan dan Kebudayaan)
- [8] Thaib Taufik 2016, November 22. Personal Interview