

## Applying Digital Technology in Exposing and Reintroducing a Forgotten Spice Plant

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### Abstract

Many people in Yogyakarta like to eat *nasi rawon*, *brongkos* rice, or *konro* soup, whose main spice is kluwak. Kluwak is the seed content of the pucung tree fruit (*pangium edule reinw*), which is fermented to convert the cyanide content of the seeds into a safely edible spice. The results of observations and interviews state that many people in Yogyakarta (as a research area) no longer know the existence of the pucung trees at all, even though the fruit and kluwak are written in the Book of Wulang Reh and Wulang Sunu written by King Paku Buwana IV; written on the Javanese *tembang* 'Bapak Pucung.' The number and existence of pucung trees in Yogyakarta are increasingly rare and forgotten. If left in its current state, the pucung tree will become extinct. That was why the creative idea of researching and making a graphic novel about this spice tree emerged. The author collaborated with Aznar Zacky, Yohannes Jatmiko Yuwono, and Viyantoro Giri Saputa to present this graphic novel for publication and socialization. The goal is for the wider community to recognize black gold (kluwak), care for and preserve this species, and cultivate its natural products smartly and ecologically.

Keywords: Pucung, Kluwak, Graphic novel unflattening, Brongkos

### A. Introduction

Nowadays, almost everyone actively working or studying in schools or colleges is focused on various systems, equipment, and ways of life related to increasingly sophisticated, complex, changeable, and ambiguous technology. Funds, time, and attention are focused on and gathering around the problem of internet-based digital technology.

On the other hand, organic, natural, and manual life often escapes public attention. Modern life and modernization have made humans avoid nature, flora, and fauna. The existence of plants – living beings that provide oxygen to humans and fellow creatures – is far from the attention of people today, including Generation Alpha and Generation Z.

In our city, most people ignore the existence and sustainability of trees that shade the environment, provide produce for humans, and support the sustainability of the environmental ecosystem. The pucung tree, also known as *pangium edule*, is a species that significantly benefits human life and the environment (Ayuningsih, 2017). Its fruit is not only used as a spice for various legendary dishes but also as a preservative spice for

foodstuffs and Natural Dessert Ingredients. Once abundant in our research area, this tree is now a rare and endangered species, a loss that would significantly impact our lives and the environment, demanding immediate attention and action (Marianto et al., 2023).

We undertook a comprehensive study on the pucung tree to address this ecological issue. This involved a Thorough literature review, extensive on-site surveys, purposeful interviews with local experts, and detailed observations of the tree's visual features. We also made a field visit to a remote village in a mountainous area, where we met a farmer who demonstrated the process of converting pucung fruit seeds, which were previously toxic due to cyanide, into a preservative spice for foodstuffs and a detergent.

We transformed our insights about the tree, its crops, and the existence of the tree in the lives of our community into a graphic novel. We work together as a working team, whose members are Aznar Zacky - a conventional comic creator - Y. Jatmiko Yuwono, and Vidyantoro Giri Saputra as digital assistants.

In the process of making this graphic novel, we have more ideas to continue working with this model with other species, either spice or herbal plants, as subjects to be transformed or transfigure innovatively. Purpose – This research is to bring the pucung (pangium) tree - a neglected spice tree – to the attention of environmental art or eco-art studies. The fermented seed of the pucung tree, called kluwak, is the main spice of several kinds of ethnic cuisines in Indonesia, such as black soup (rawon, East Java), konro soup (South Sulawesi), brongkos (in Yogyakarta); other parts of the tree are suitable for several purposes (Arini, 2012). Unfortunately, like many other spice and herb trees that are forgotten, this tree is no longer in the discourse of the community that uses it, at least in major cities in Indonesia. From interviews with many students from various regions of the country studying at the Indonesian Institute of the Arts Yogyakarta, it can be concluded that almost all of them do not know where the seeds come from, what kind of trees they are, and how they exist now. This species will likely become extinct due to the lack of recognition and preservation efforts. If the current situation is left unchecked, the ecological consequence is not only to local people but also to the world botany community.

## **B. The Aim**

To create a graphic novel about the tree, its various usefulness, and its mystery to attract public attention to the existence of the tree itself in the world to generate public

empathy for this species; therefore, many people get interested in recognizing, preserving, and cultivating the tree in ecological and intelligent ways, offering hope for its sustainability.

### **C. Methods**

This paper utilizes the theory of multimodality, incorporating methods and techniques such as 1. Hunting the presence of trees in chosen areas in Yogyakarta to empirically observe the trees, documenting their components and environmental context; 2) Studying literature on the practical uses of products derived from this tree in daily life and gathering insights from people's responses when asked about the seed and the species' existence; 3) collaborating with a comic maker and one digital assistant to produce a graphic novel.

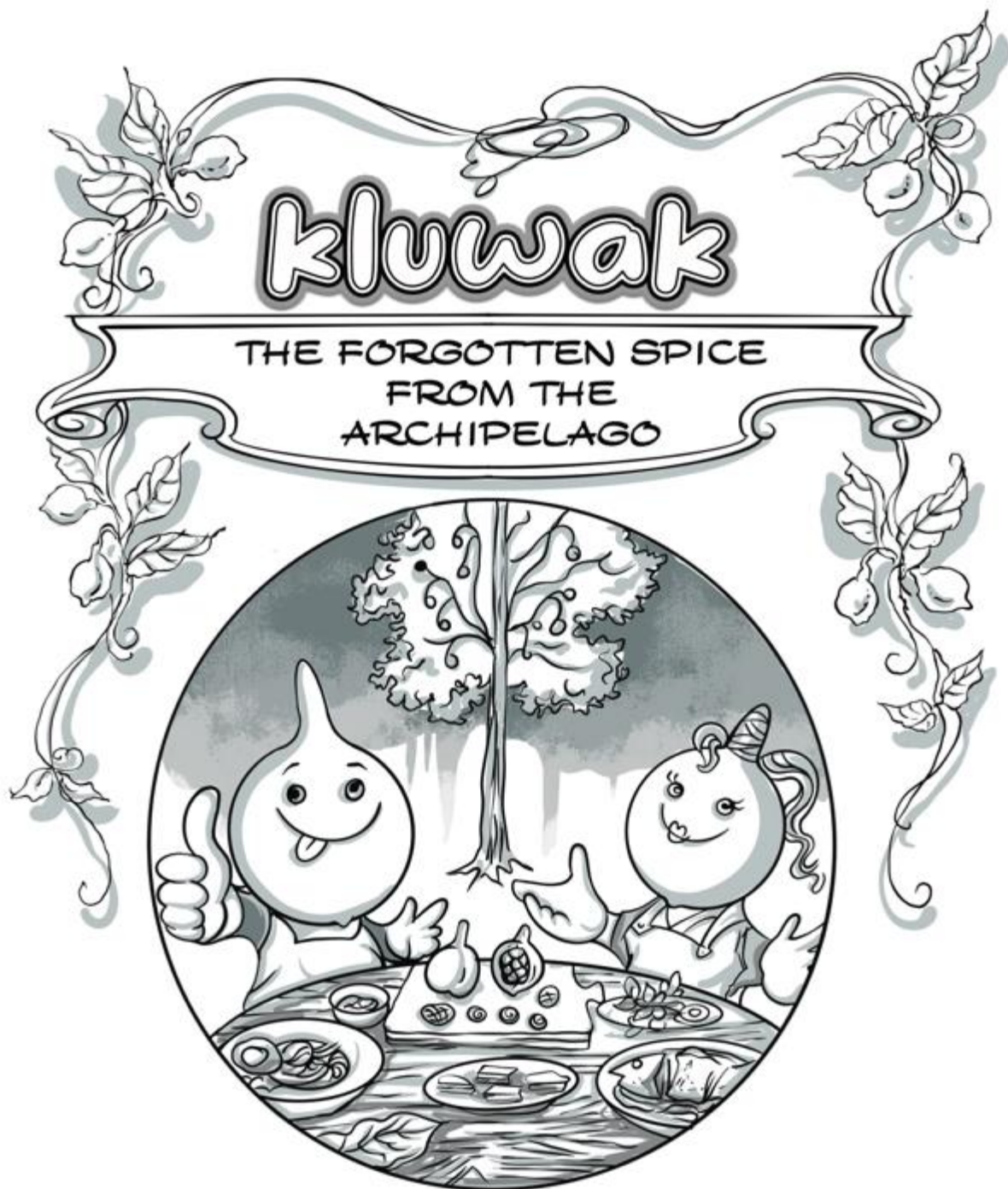
### **D. Findings**

The pucung tree, with its unique components and potential uses, is a fascinating subject. The words 'buah pucung' and 'biji pucung' are significantly mentioned in a moral guidebook, *Serat Wulang Reh*, by Raja Paku Buwono IV at the end of the 19th century, and in the Javanese old song, the word 'pucung' is also mentioned. Some popular Javanese cuisines use spices from pucung fruit seeds called 'kluwak,' but ironically, most people in the research area no longer know their origin. The number of kluwak trees in the research area is also quite rare, very far from what is known by parents who are still young (Efendi et al., 2020). Almost all components of this tree are functional for practical needs, such as spices, herbal medicinal ingredients, and wood, which are suitable for various needs (Atabani et al., 2015). Its continuity is threatened because most people take the seeds and even cut down this tree without considering rejuvenating it. If this situation is unchecked, this tree will become extinct in the research area, namely in Yogyakarta. Through in-depth observation and visual exploration, we can state that the distinctive and unique forms of the components of the pucung tree are either used as elements to be assembled or in images that can be used to represent anything.

### **E. Originality/value**

To date, neither eco-art nor eco-design uses the pucung tree as an exclusive subject to explore and develop through graphic novel media. However, this graphic novel is not the end in itself; it is only the media for generating public eco-awareness that the trees are fellow living beings who have the right to live according to their nature and that

the beauty of trees is when they are still alive for the world survival and the sustainability of the ecosystem of the living environment (Thorsen, 2020).



M DWI MARIANTO  AZNAR ZACKY



YOGYAKARTA, LIKE OTHER CITIES IN THE ARCHIPELAGO, FACES THE SAME ECOLOGICAL PROBLEMS, ONE OF WHICH IS THE DISAPPEARANCE OF LARGE TREES, SPICE VEGETATION, AND ENDEMIC SPECIES. THE CAUSES ARE MANY. TREES ARE STILL SEEN AS INANIMATE OBJECTS, EVEN AS SHADE. THEY ARE HAPHAZARDLY CUT DOWN, POISONED, OR MOWED DOWN. GREEN OPEN SPACES FOR TREE ROOTS ARE BECOMING SCARCE. DON'T KNOW THEM, DON'T LOVE THEM; THE DISAPPEARANCE OF RARE TREES IS 'COMMONPLACE'; IF THEY GO EXTINCT, 'SO WHAT?'

ONE OF THE ENDANGERED SPECIES IS THE PUCUNG TREE (*PANGIUM EDULE*), WHOSE SEEDS ARE MADE INTO KLUWAK BY FERMENTING THEM FOR 30 TO 40 DAYS. THE POISON IS USED AS A SPICE.

THE CONTENTS OF KLUWAK ARE USED AS THE MAIN SEASONING FOR VARIOUS ETHNIC DISHES, INCLUDING: BRONGKOS (YOGYAKARTA CUISINE), RAWON (EAST JAVA CUISINE), SOP KONRO (MAKASSAR CUISINE), AND GABUS PUCUNG (BETAWI CUISINE). THE CONTENT OF KLUWAK SERVES AS A FLAVORING, NATURAL PRESERVATIVE, AND DEODORIZER. THE SEEDS OF THE PUCUNG TREE CAN BE CALLED ONE OF THE FORGOTTEN SPICES IN INDONESIA, MANY PEOPLE DO NOT KNOW THE ORIGIN, EXISTENCE, AND EXISTENCE OF THE PANGIUM TREE. IN FACT, THIS TREE IS A MULTIPURPOSE TREE.

THE MAIN MESSAGE OF THIS GRAPHIC NOVEL IS TO EXPLAIN THE UNIQUENESS, USEFULNESS, AND IMPORTANCE OF THE PUCUNG TREE SO THAT MORE PEOPLE WILL KNOW, LOVE, PRESERVE, AND CULTIVATE THE OLD SPECIES CALLED PANGIUM TREE, A NATURAL SOURCE OF SPICES, WHOSE EXISTENCE IS NOW THREATENED WITH EXTINCTION. BECAUSE THE BEAUTY OF THE PUCUNG TREE IS NOT IN ITS EXTINCTION AND BECOMING A STORY, BUT IN ITS CONTINUATION TO BE MANAGED IN AN **ECO-ESTHETIC** WAY FOR THE GOOD OF ALL; HUMANS AND THE PUCUNG SPECIES AS PART OF THE UNIVERSE.



*M Dwi Marianto*





SINCE THE 8TH CENTURY, THE PEOPLE OF THE ARCHIPELAGO HAVE CONDUCTED CROSS TRADE BY BARTERING NATURAL RESOURCES AND HANDICRAFTS WITH FOREIGN LANDS SUCH AS CHAMPA, CHINA, GUJARAT.

THE ARCHIPELAGO IS KNOWN AS A LAND OF TENS OF THOUSANDS OF LARGE AND SMALL ISLANDS, VERY FERTILE IN PRODUCING VARIOUS KINDS OF HIGH QUALITY SPICES.

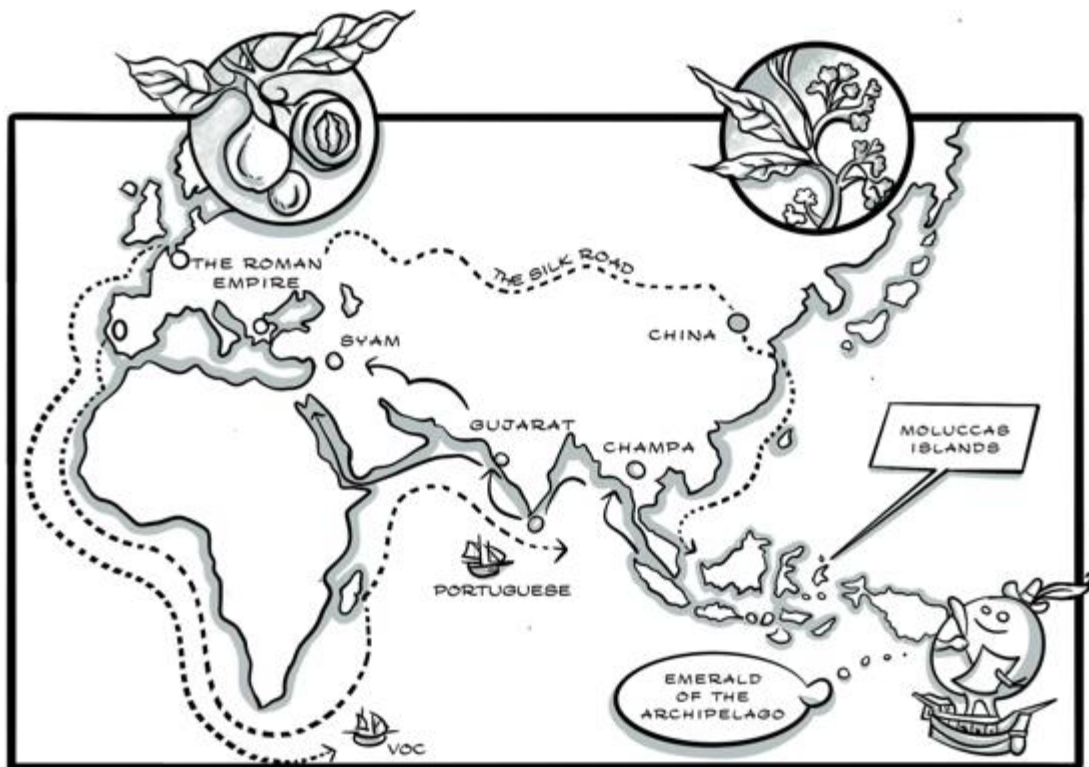
THE FLOW OF TRADE IS GETTING WIDER, GUJARATI TRADERS BROUGHT SPICES TO THE COUNTRY OF SYAM WHICH WAS THEN CONTINUED BY SYAM TRADERS TO BYZANTINE - THE VICTORIOUS EASTERN ROMAN EMPIRE AT THAT TIME.

WHEN THE SPICES OF THE ARCHIPELAGO REACHED EUROPE, THE LAND OF THE FOUR SEASONS, THEY BECAME THE MOST SOUGHT-AFTER AND NEEDED COMMODITIES. THEIR VALUE SOARED DUE TO THE LENGTH AND DISTANCE OF THE TRADE ROUTES.

THIS MADE THE PEOPLE OF EUROPE CURIOUS ABOUT 'WHAT COUNTRY DO THE SPICES ORIGINATED'.

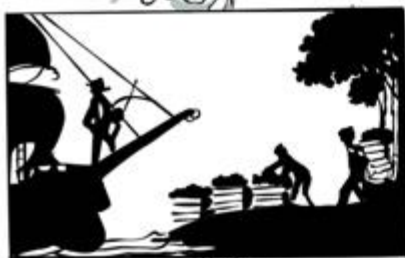
TRANSOCEANIC SHIPPING FLEET EXPEDITIONS AS PROOF OF THE RENAISSANCE CONCEPT, WERE CARRIED OUT BY MAGELHAENS, MARCOPOLO, AND COLUMBUS. THE FIRST TWO MADE IT TO THE ARCHIPELAGO.

MARCOPOLO'S NOTES READ 'THE EMERALD STRAND OF THE EQUATOR—A STUNNING, LUSH, PROSPEROUS LAND ON THE EQUATOR. THE PORTUGUESE FLEET IN THE MID 16TH CENTURY, FOLLOWED BY THE VOC FLEET, MARKED THE BEGINNING OF THEIR COLONIAL PERIOD.





BEFORE THE ARRIVAL OF THE PORTUGUESE AND VOC FLEETS, THE INDIGENOUS PEOPLE OF THE ARCHIPELAGO WERE SELF-SUFFICIENT—PROSPEROUS IN CULTIVATION—CULTIVATING ON THEIR OWN LAND, CUSTOMARY LAND, VILLAGE LAND.



THE VALUE OF THE ARCHIPELAGO'S SPICES IN THE EARLY GUJARAT – SHAM – BYZANTINE – EUROPEAN TRADE, WHICH LED TO THE ARRIVAL OF THE PORTUGUESE AND VOC FLEETS SAILING DIRECTLY FROM THEIR LANDS, LED TO VARIOUS ONGOING PROBLEMS IN THE ARCHIPELAGO.

## COLONIALISM



INITIALLY THE PORTUGUESE AND THE VOC DID ORDINARY TRADE, BUT OVER TIME THEY INCREASINGLY CONTROLLED TRADE FLOWS, SPICES, REGIONS, WITH A PATTERN OF AGREEMENTS THAT WERE DETRIMENTAL TO THE NATIVES—MILITARY PRESSURE—DEVIDE ET IMPERA, AS WELL AS POWER OVER VILLAGE LAND—VAST INDIGENOUS CUSTOMARY LAND—PLUS TRIBUTE SYSTEMS FOR DEFEATED TRIBES OR KINGDOMS.







THE COLONIAL GRIP BECAME STRONGER WHEN THE VOC WENT BANKRUPT IN THE 18TH CENTURY, AND WAS REPLACED BY THE DUTCH EAST INDIES GOVERNOR'S ADMINISTRATION. NOT ONLY THE SPICES THAT HAD BEEN THE PRIMA DONNA IN THE PAST, SUCH AS NUTMEG, CLOVES, CINNAMON, ONIONS, PEPPER; IN THE FOLLOWING PERIOD, IT WIDENED TO NEW TYPES OF PRIMA DONNA CROPS, SUCH AS COFFEE, COCOA, TEA, AND SUGAR CANE.

STARTING IN 1830 GOVERNOR VAN DEN BOSCH IMPLEMENTED A SYSTEM OF FORCED CULTIVATION, BOTH ON THE PEOPLE'S PLANTATIONS, AS WELL AS ON THE LAND OF NEW TERRITORIES THAT HAD BEEN CAPTURED—CONTROLLED BY MILITARY FORCE.

THE NATIVES, CALLED INLANDERS, WERE COMPLETELY DEPRIVED OF THEIR FATE, LIFE AND DIGNITY IN THEIR OWN LAND. THE IMPACT WAS FELT UNTIL AFTER INDEPENDENCE: CHAOTIC IN TERMS OF CUSTOMARY LAND MANAGEMENT RIGHTS. ONE EXAMPLE IS PTPN 2 IN NORTH SUMATRA.



NUTMEG



CLOVE



LEMON  
GRASS



GINGER



TURMERIC



TAMARIND



CINNAMON



GARLIC



PEPPER



BITTER  
BEAN



MORINGA



CANDLE NUT



PANGIUM



CELERY



CHILI  
PEPPER



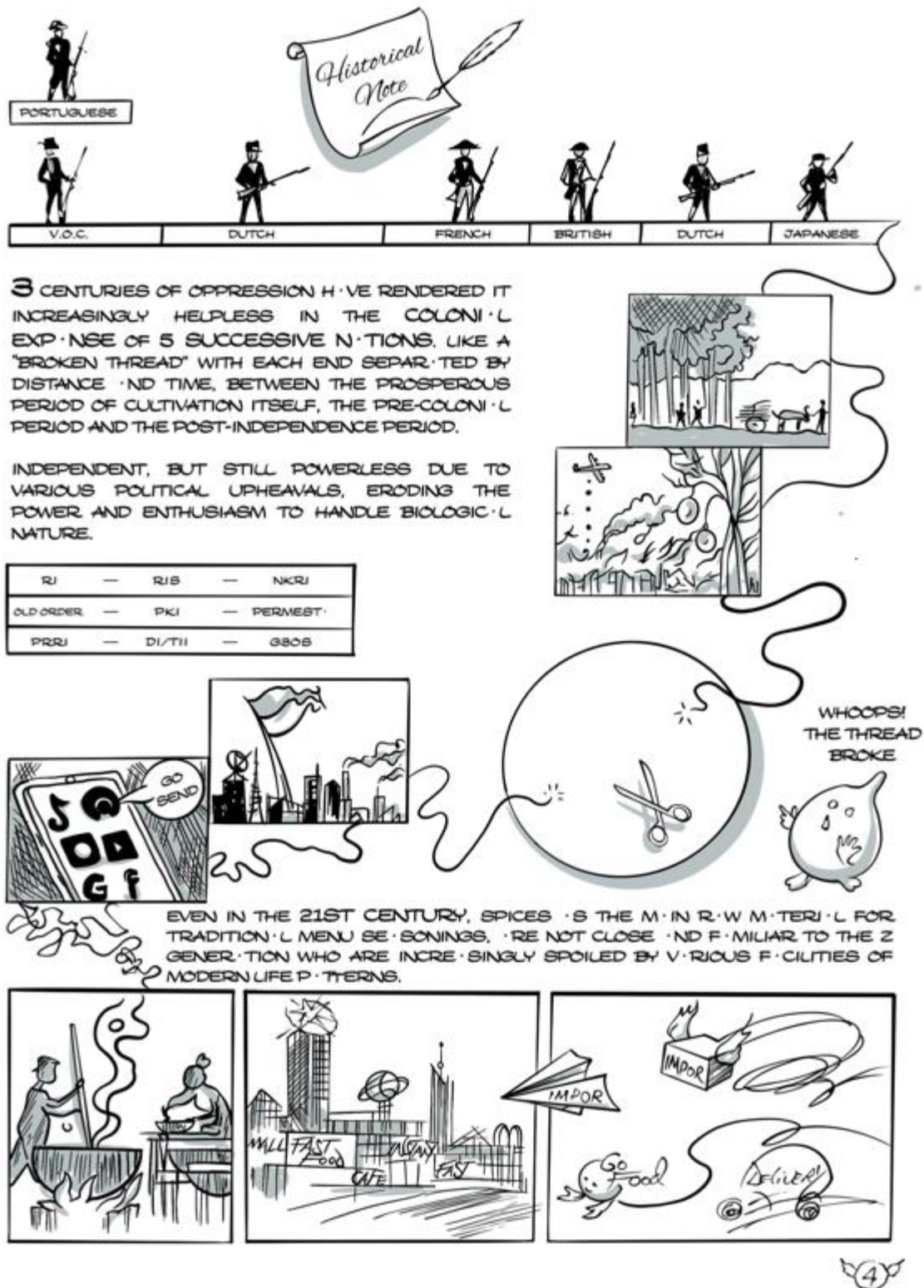
CORIANDER

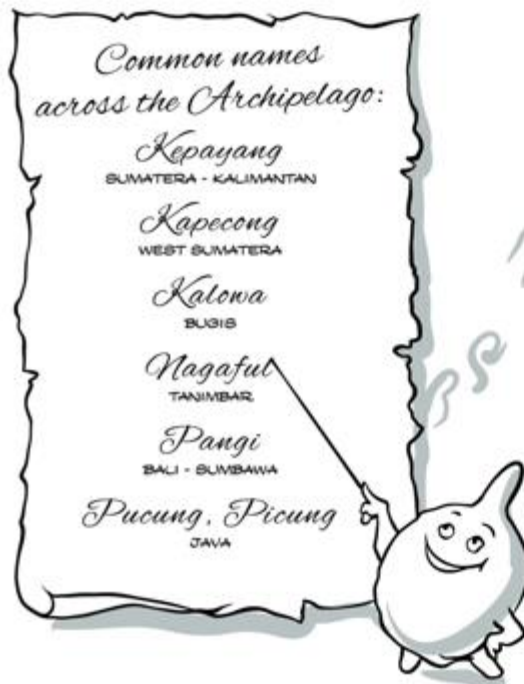
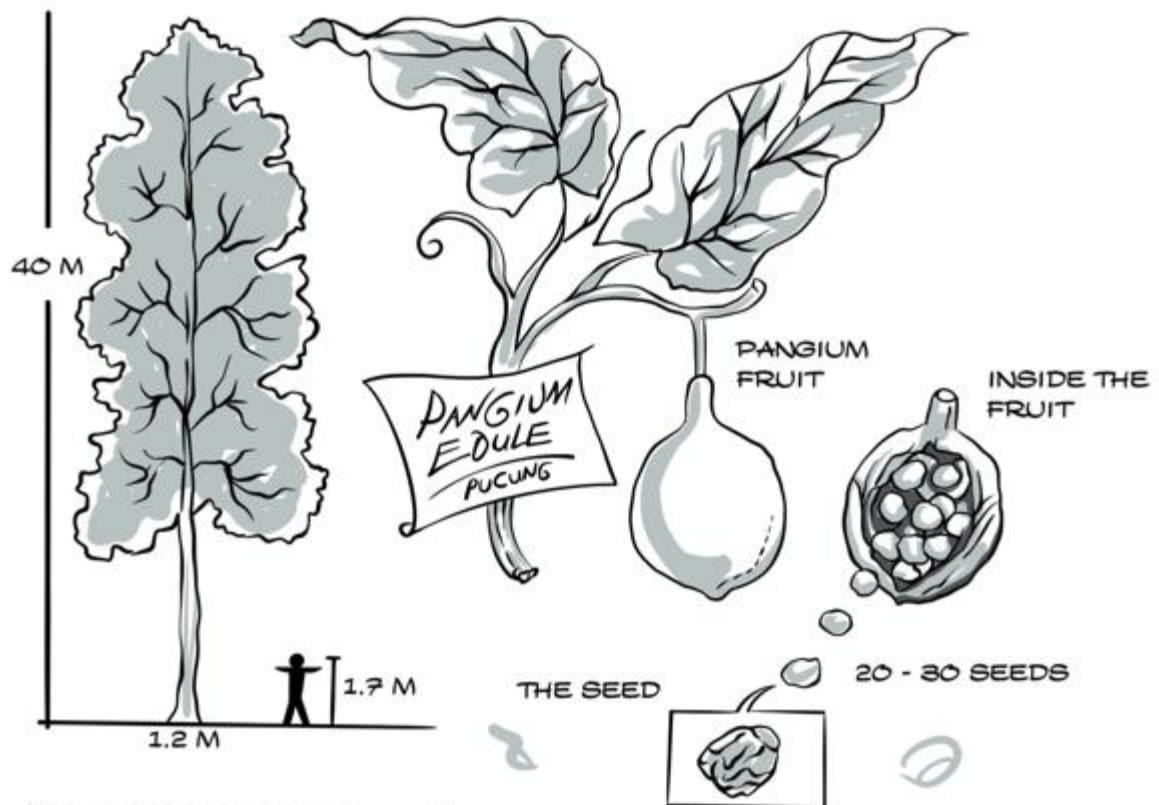


GALANGAL



BAY LEAF





1. CLEAN THE SEEDS  
AND BOIL THEM FOR  
AT LEAST 60 MINUTES



2. LET THE SEEDS  
COOL



3. PLACE THE SEEDS  
ALONG WITH SOME  
ASHES INTO A PLASTIC  
BAG, FERMENT IT FOR  
30 - 40 DAYS

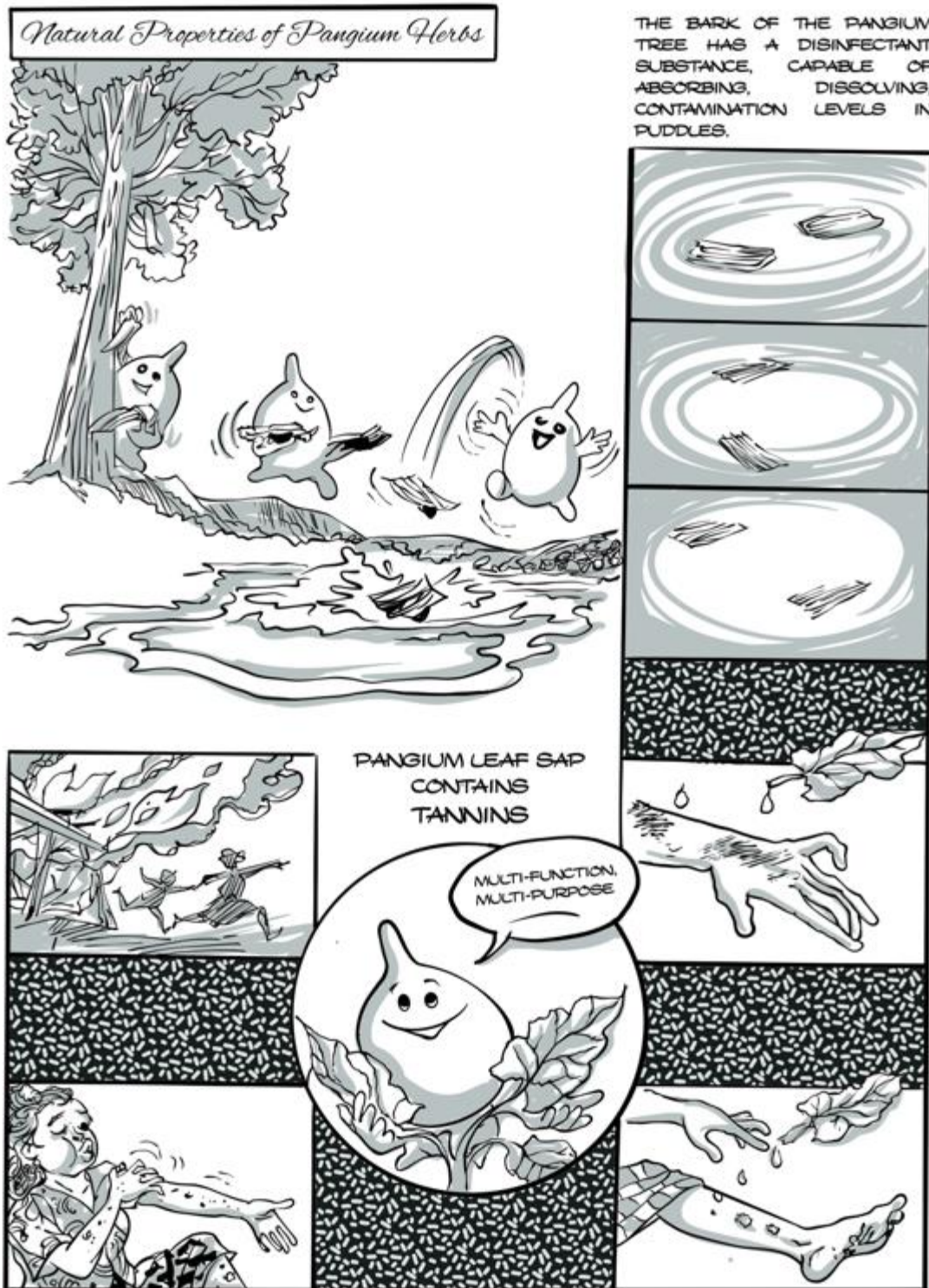


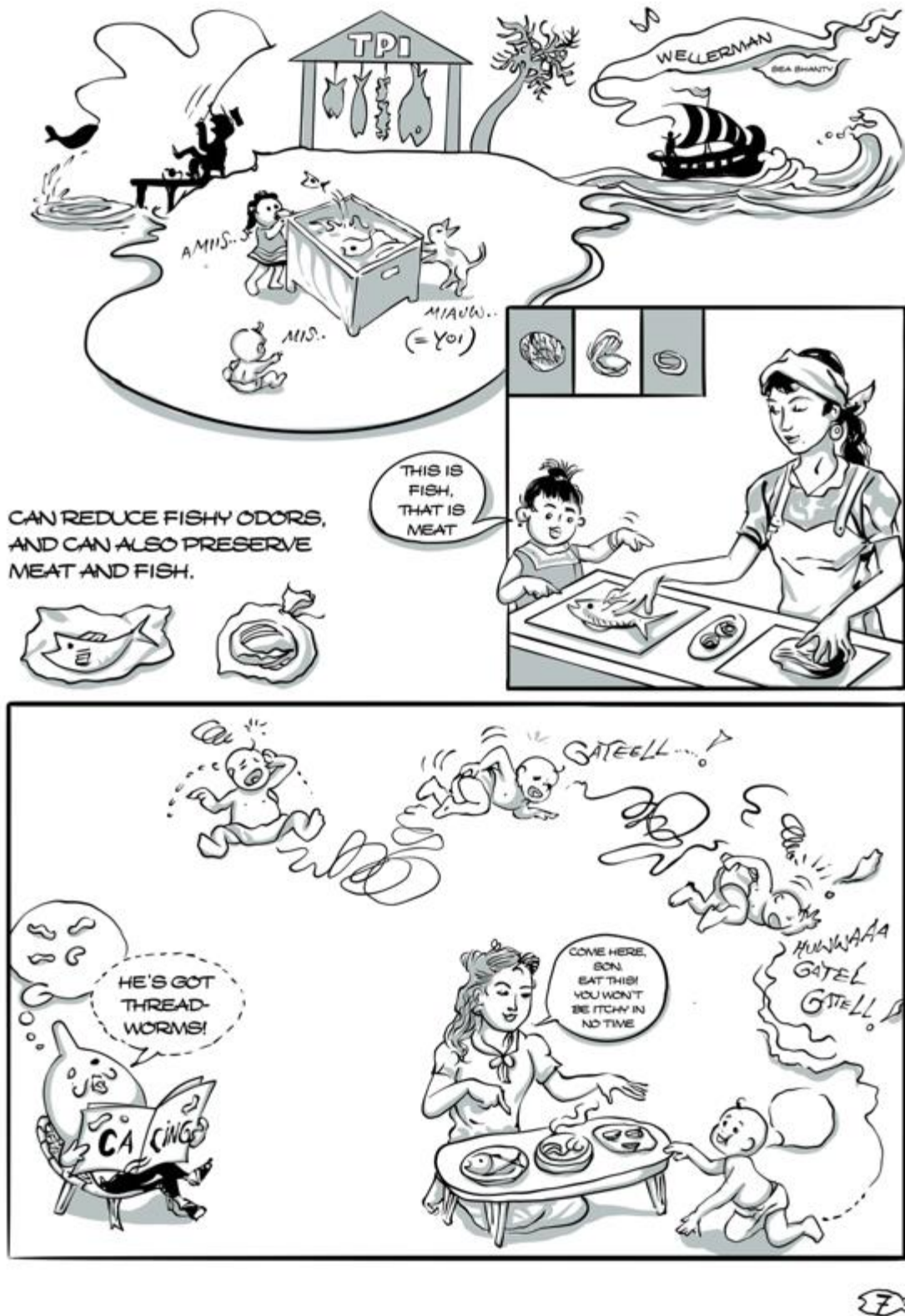
READY AS A  
SEASONING



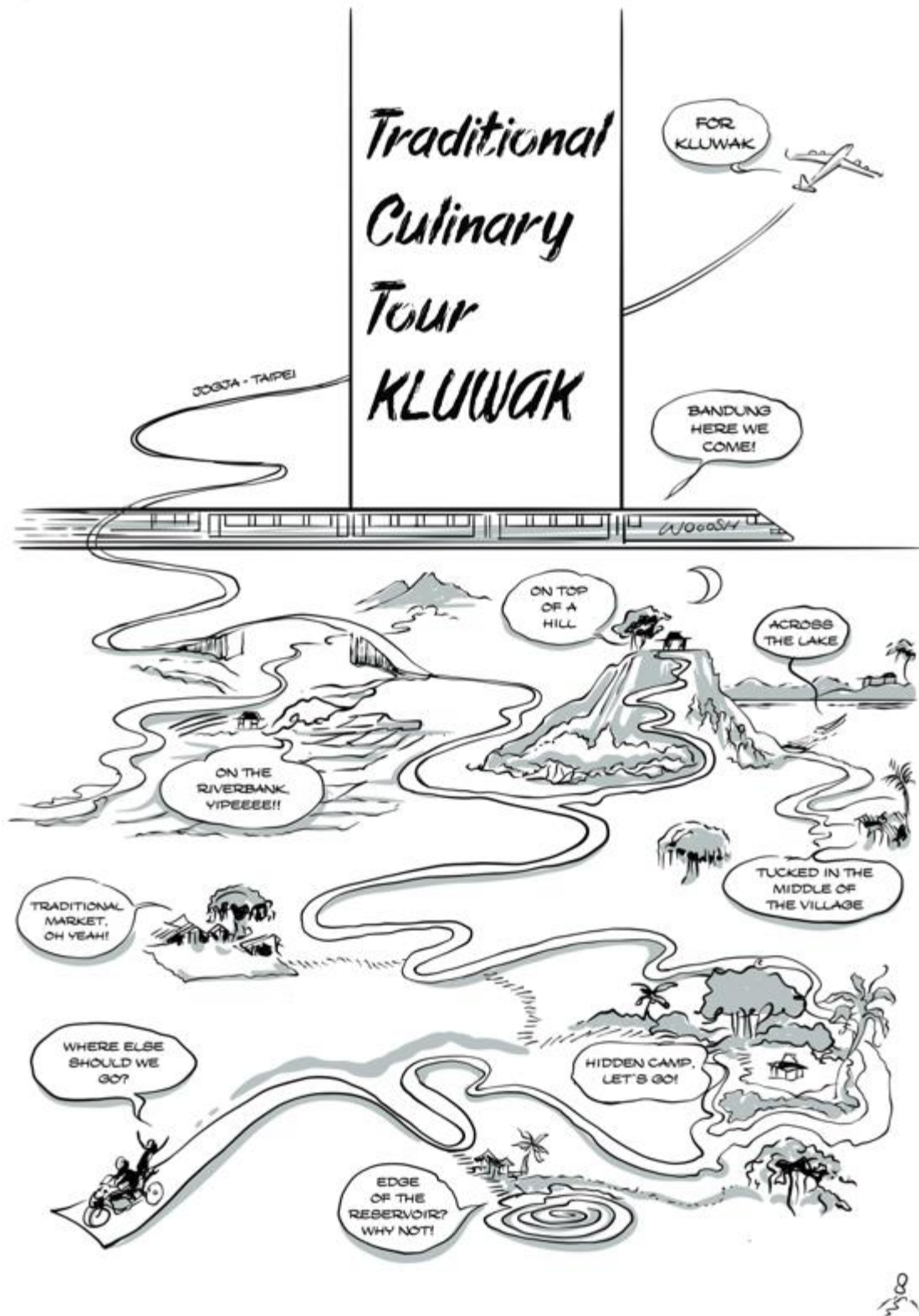
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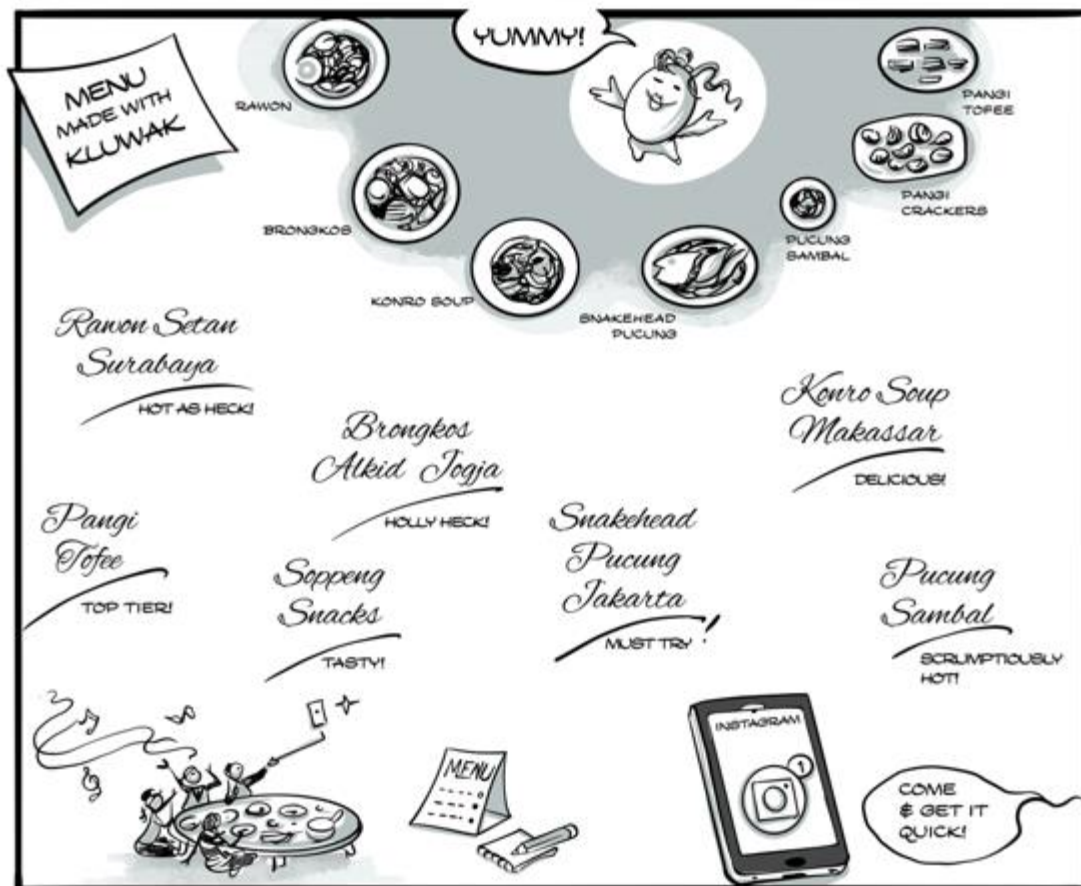
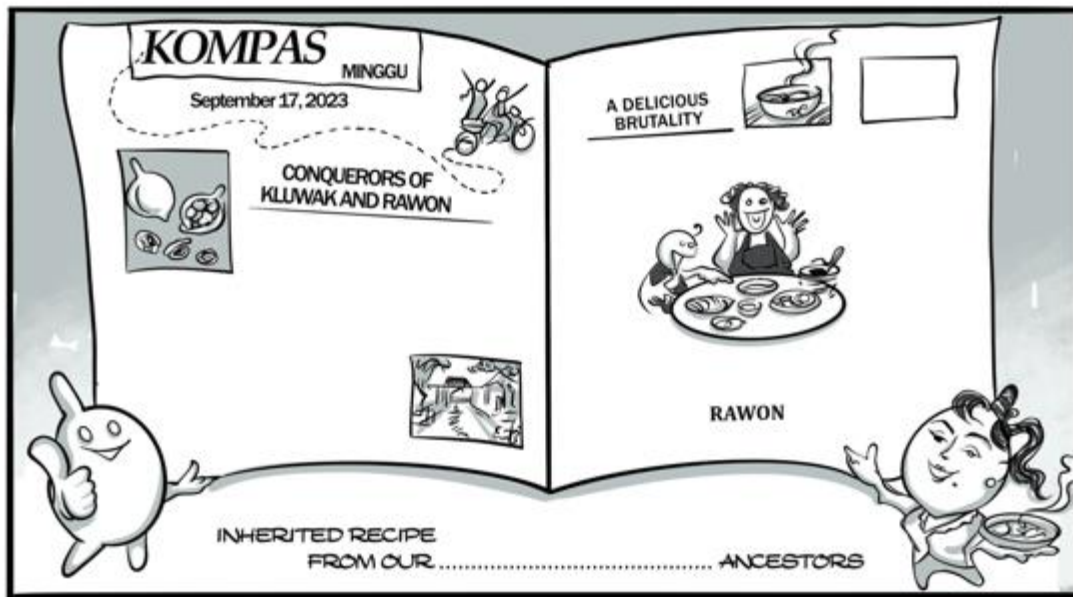




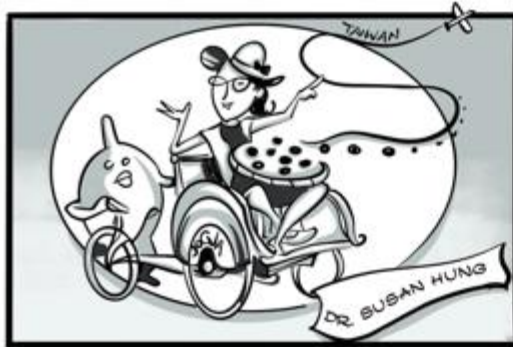












BOUGHT KLUWAK FROM BERINGHARDO MARKET, JOGGJAKARTA TO BRING BACK TO HER HOME COUNTRY, TAIWAN



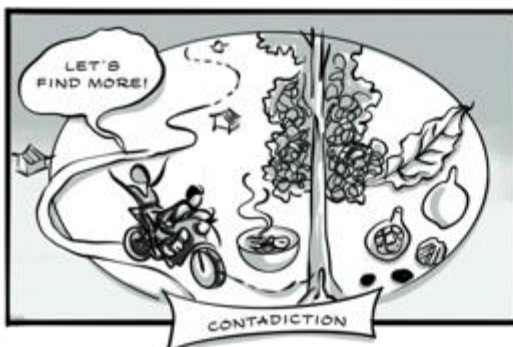
CLAIMED THAT THE NUTMEG PLANTS IN HIS COUNTRY, GRENADA, ORIGINATED FROM INDONESIA



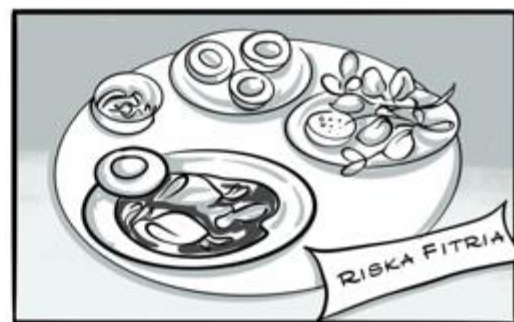
WON A FISHING TOURNAMENT USING BAIT MADE OUT THE PULP OF KLUWAK SEED, EVEN FISH LOVES KLUWAK!



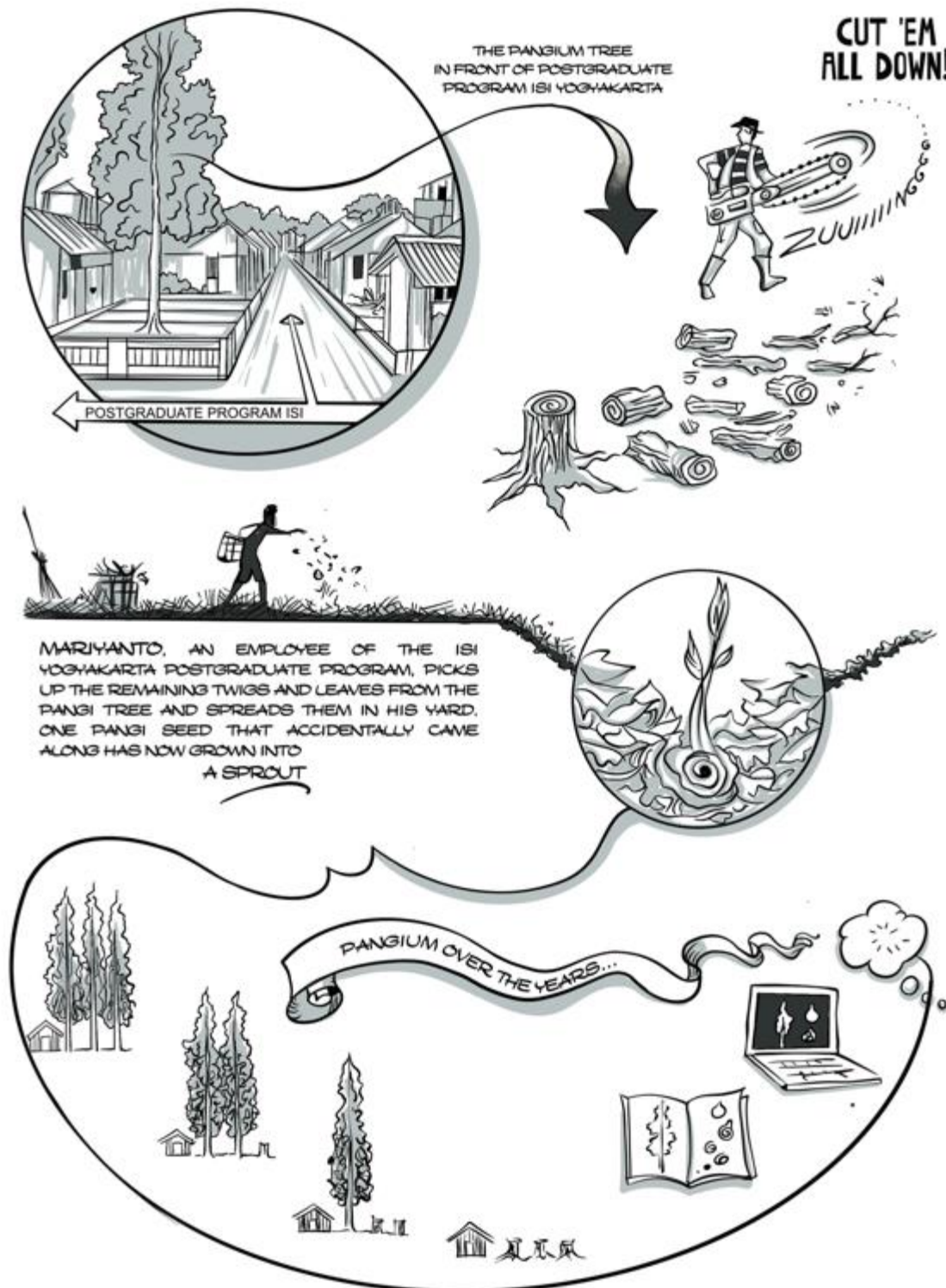
THIS BETAWI SPECIALTY IS OFTEN FOUND AT THE JAKARTA FAIR



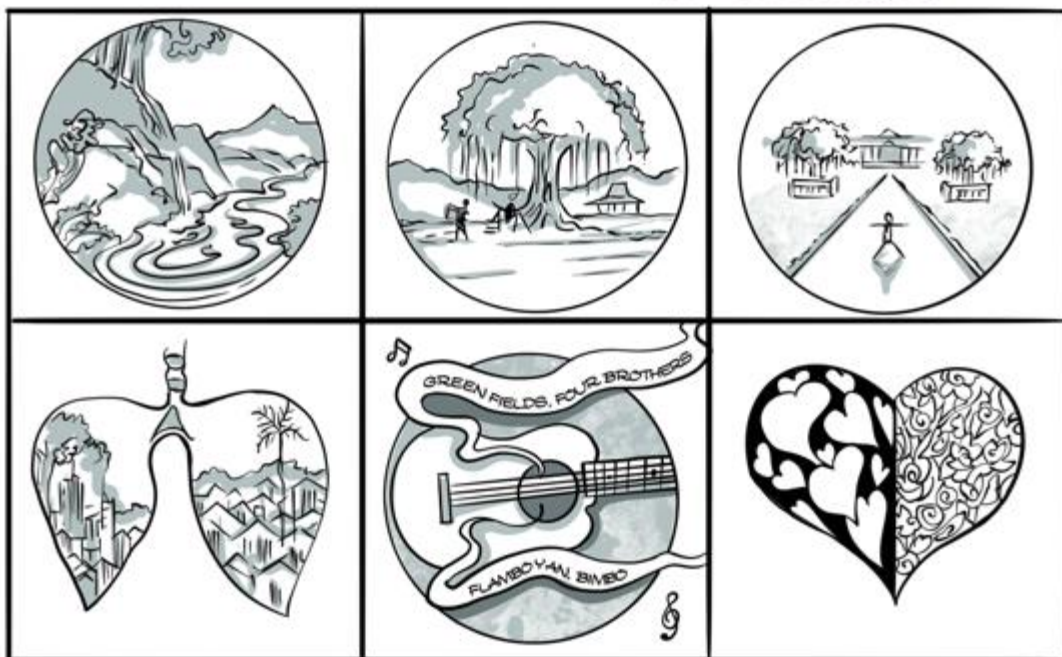
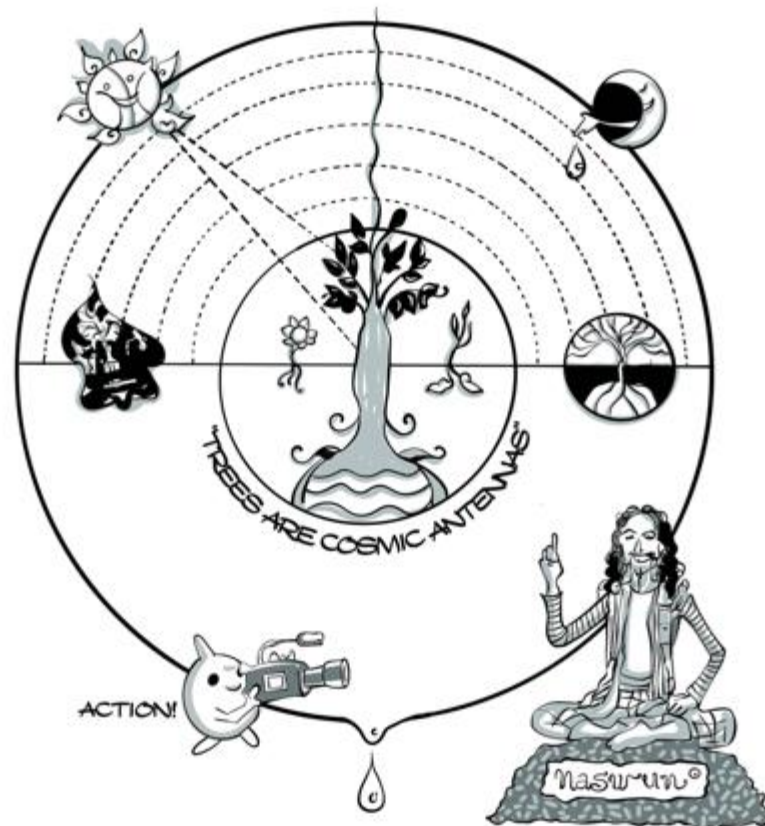
FOODIES KNOW NOTHING ABOUT SPICE TREES

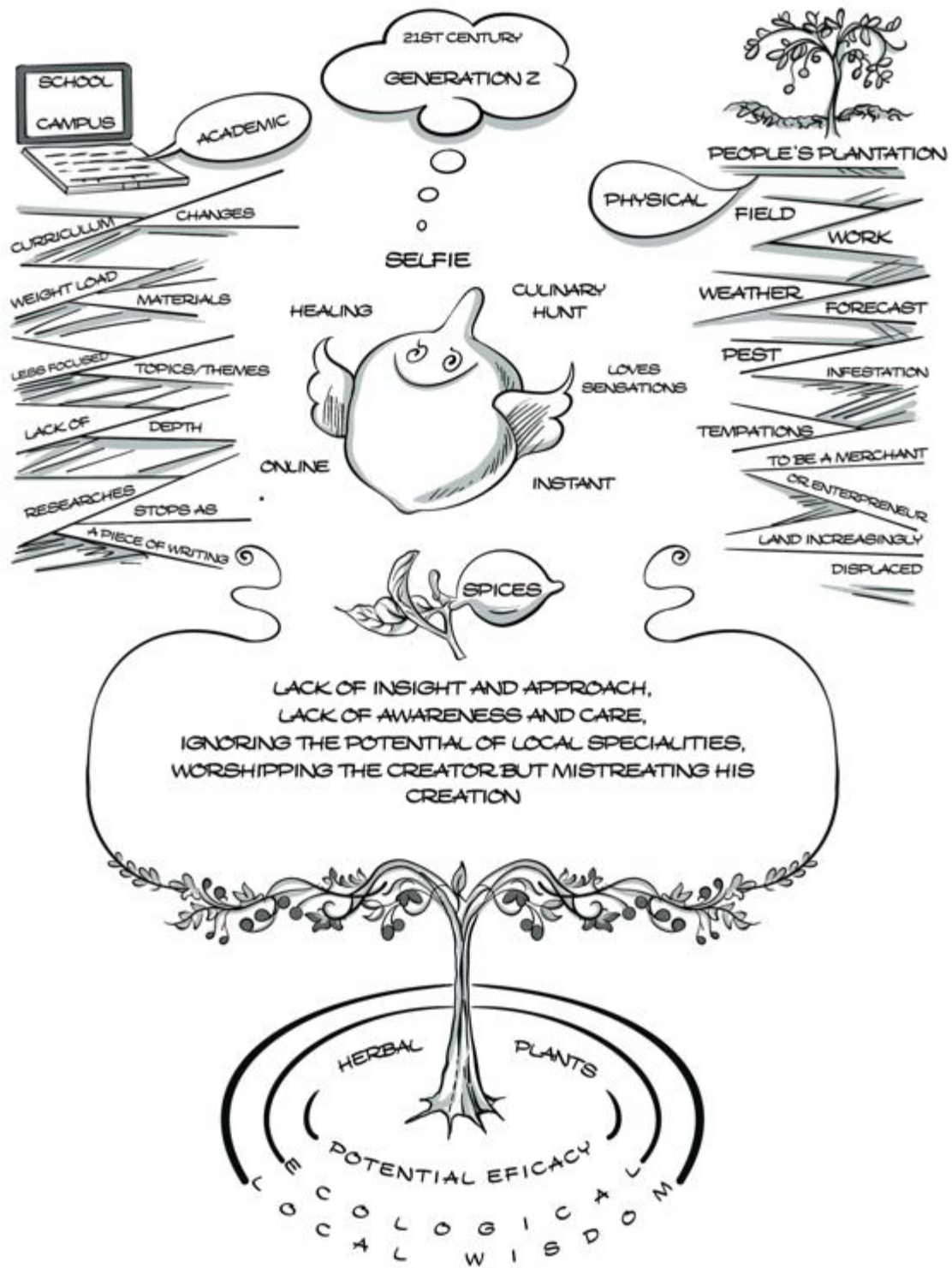


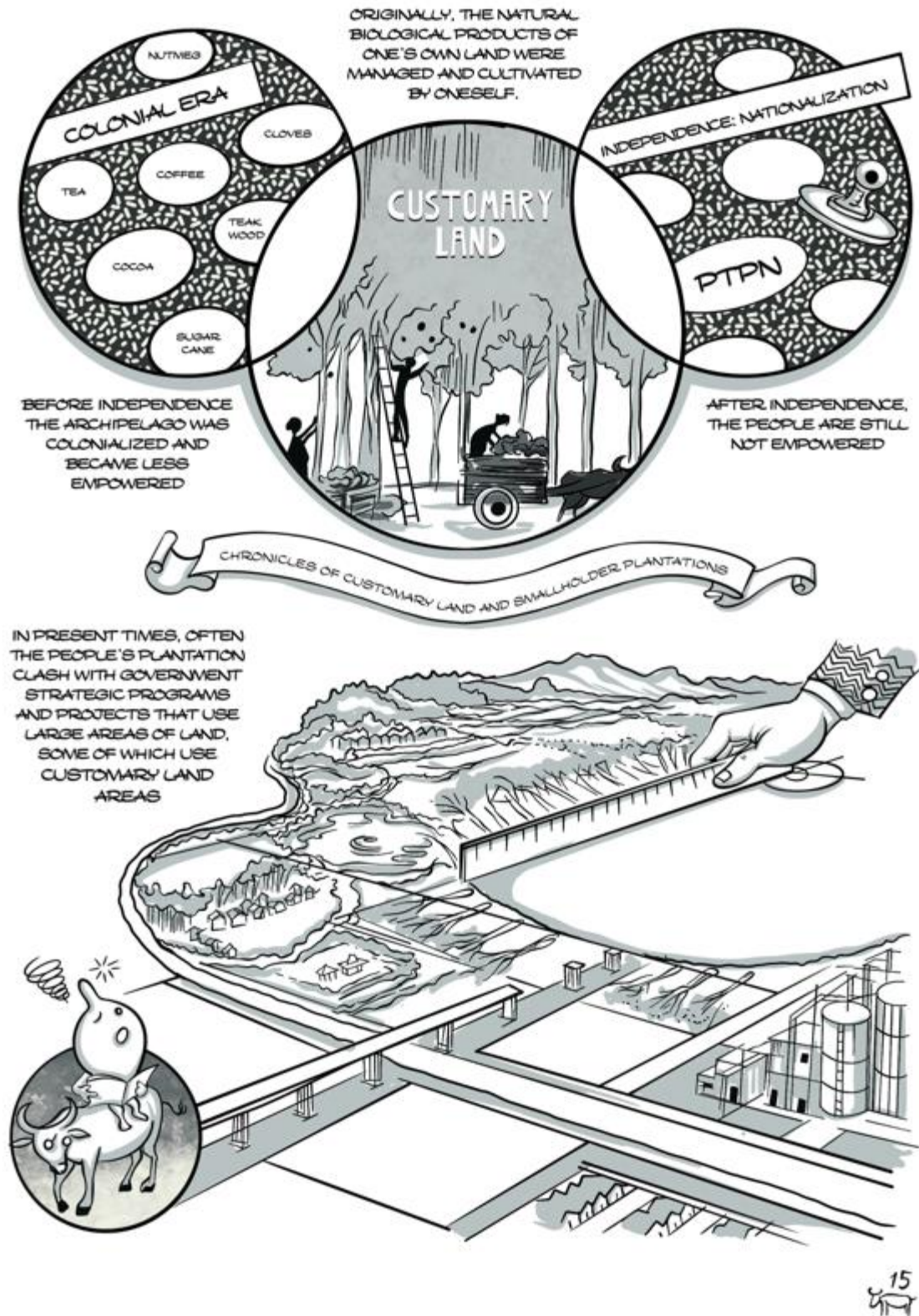
RAWON WAS NAMED 'THE BEST SOUP' BY TASTE ATLAS, FEBRUARY 28, 2024















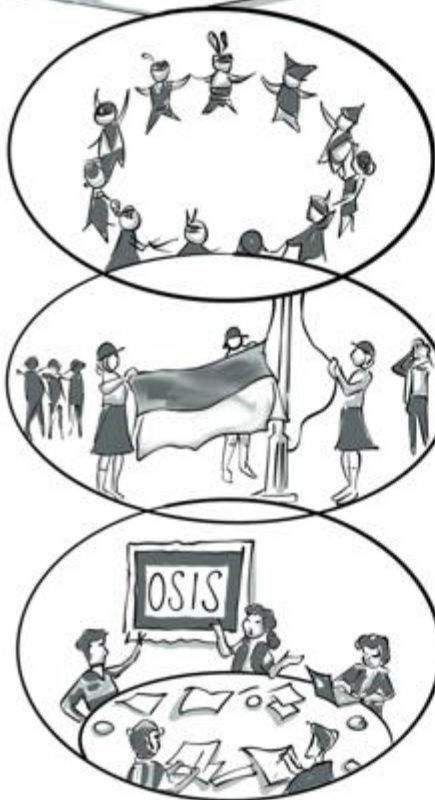
*Paku Buwana IV*  
SURAKARTA SULTANANE, WROTE  
*Serat Wulang Sunu*

AS A RESULT OF THINKING, CONTEMPLATION,  
APPRECIATION, WHICH IS POURED INTO WRITING  
CONTAINING PHILOSOPHICAL VALUES OF LIFE.

*Wulang Reh*

ADVICE ON MORAL EDUCATION, KNOWLEDGE OF  
VIRTUES, SELF-CONTROL, PERSONALITY,  
WISDOM, SINCERITY, MANNERS, FILIAL PIETY

IN ORDER TO ACHIEVE NOBILITY OF LIFE.



*Serat Wulang Sunu*

ADVICE ON THE IMPORTANCE OF  
HARMONY, UNITY AND INTEGRITY.

"KAMULANE KALLWAK NOMNOMANIPUN  
PAN DADI SATUNGGAL PUCUNG ARANIRA,  
UGI YEN WUS TUWA KALLWAKE PISAH-  
PISAH..."

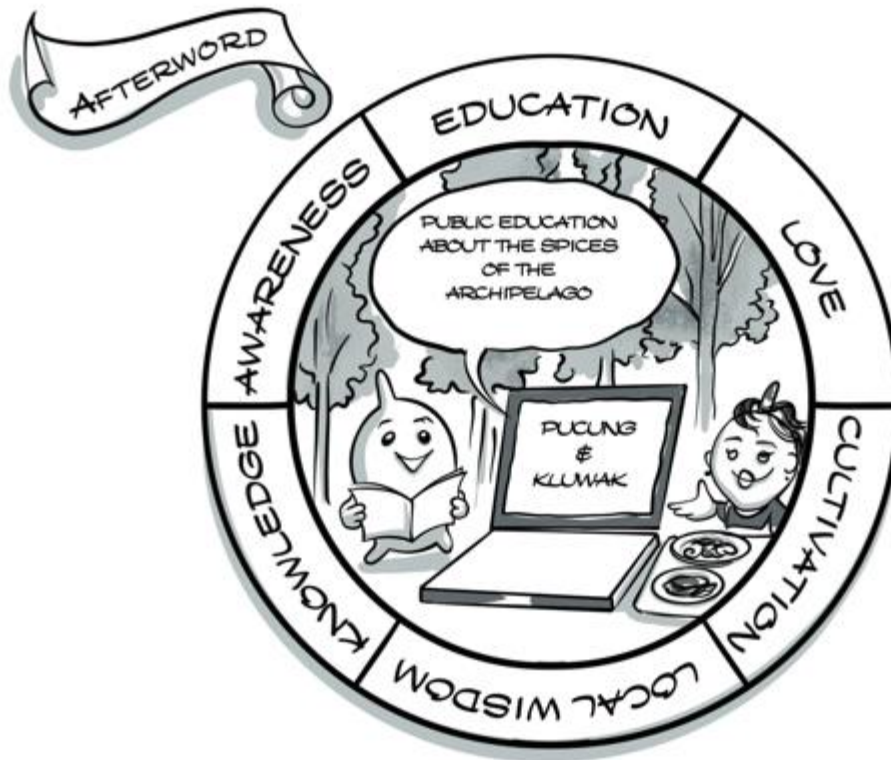
WHEN YOUNG, THE KLUWAK FRUIT IS  
FUSED TOGETHER AND CALLED PUCUNG,  
WHEN OLD THE KLUWAK IS SEPARATED.

"AJA KAYA KALLWAK DUK ANIM KUMPUL  
BISA, WIS ATUWA PATING SALEPAR SIJI-  
SIJI, NORA WURLUNG DADI BUMBU  
PINDHANG LULANG..."

DON'T BE LIKE THE KLUWAK WHEN IT'S  
YOUNG IT'S UNITED, BUT WHEN IT'S OLD  
EACH ONE SPREADS OUT, EVENTUALLY  
ONLY AS A SPICE.

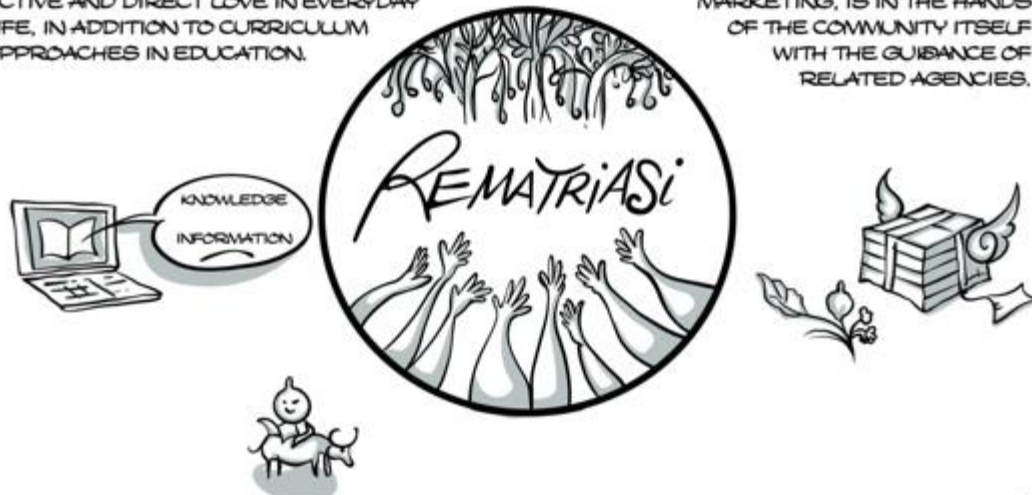


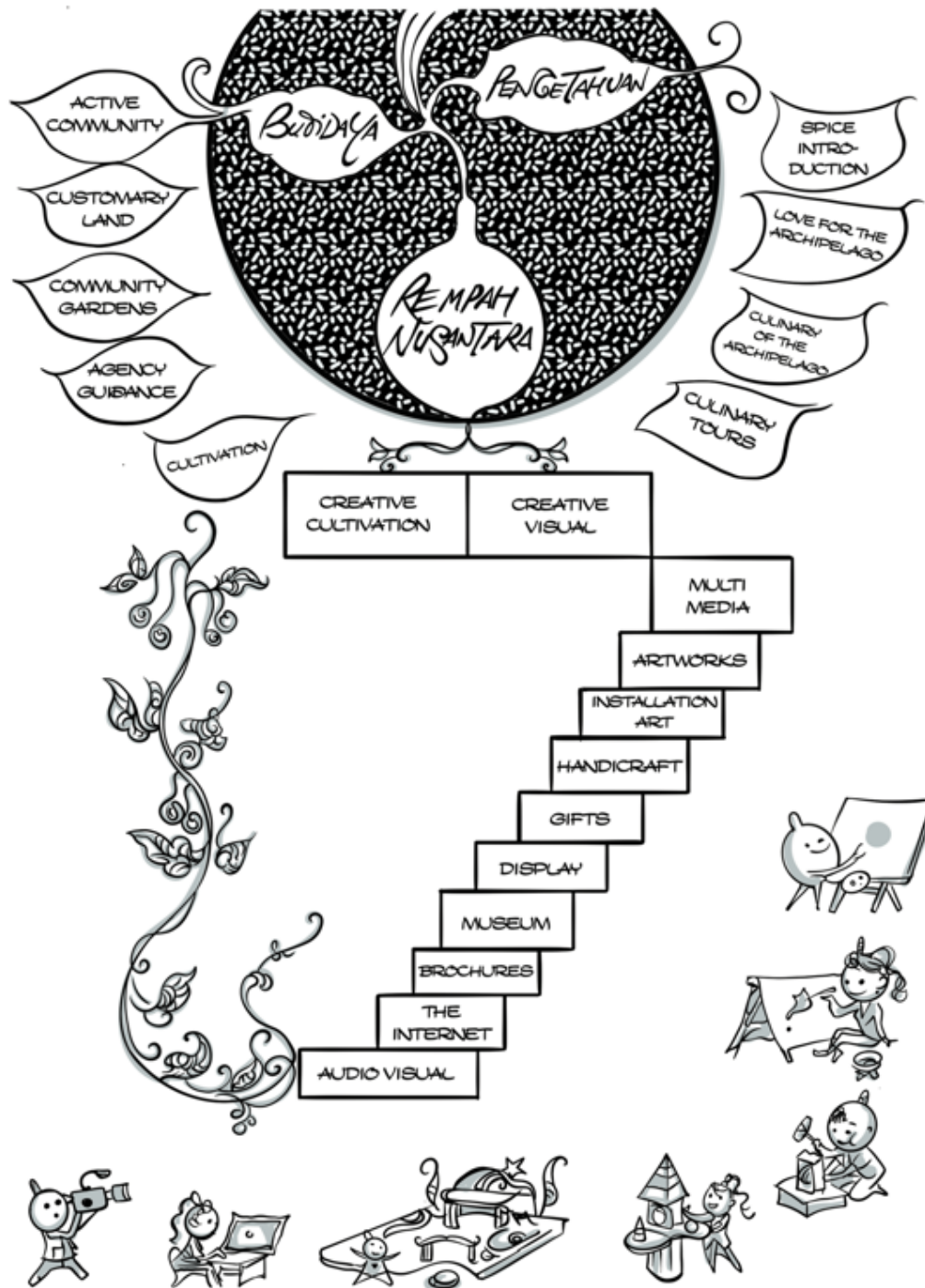


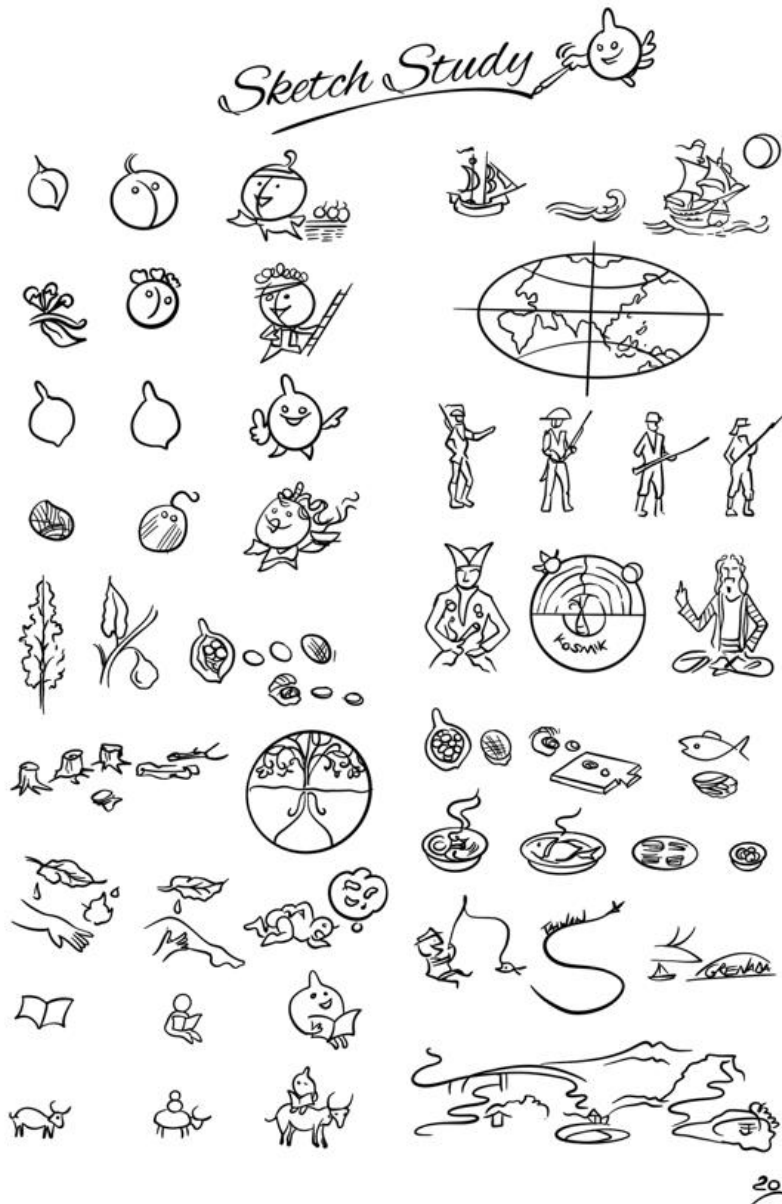


THE UPS AND DOWNS OF THE ARCHIPELAGO'S SPICES, BOTH IN THE COLONIAL PERIOD AND AFTER INDEPENDENCE UNTIL NOW, WHICH ARE AMONG THE SIEGE OF CHEMICAL PREPARATIONS AND INSTANT MODERN HERBAL PREPARATIONS, REALLY NEED AN ATTITUDE OF ATTENTION, AWARENESS, ACTIVE AND DIRECT LOVE IN EVERYDAY LIFE, IN ADDITION TO CURRICULUM APPROACHES IN EDUCATION.

VARIOUS EFFORTS NEED TO BE MADE TO RESTORE THE ESSENCE AND DIGNITY OF THE ARCHIPELAGO'S SPICES SO THAT THEY CAN RETURN FULLY TO MOTHER EARTH. THE ATTITUDE OF RESTORING BIOLOGICAL RESOURCES, LOCAL RESOURCES, CULTIVATION, PRODUCTION PROCESSING, TO MARKETING, IS IN THE HANDS OF THE COMMUNITY ITSELF WITH THE GUIDANCE OF RELATED AGENCIES.







## Conclusion

Kluwak is one of the forgotten spices of the archipelago; if left alone, it will surely become extinct, even though its usefulness is excellent. Kluwak and the pucung tree, written in *Serat Wulang Reh* and *Wulang Sunu* - the book of ethics and etiquette of the Surakarta Palace imply that in the 18th century, the pucung tree, fruit, and seeds were an integral part of Javanese culture. From this study, it can be stated that most people in Yogyakarta, and from various regions, no longer know and care about the origin of kluwak seeds; they only know dishes whose spices contain kluwak seeds. If the pucung tree is not discussed, promoted again, and preserved, it will surely become extinct, and it is certain that even if it becomes extinct, the community will not be sad because they will not know either. Processing natural kluwak seeds into ready-to-use kluwak is also worth

exploring. The kluwak cultivators in the past have applied a powerful local technology, namely changing the cyanide contained in the pucung seeds into spices that function as food preservatives, remove fishy odors, act as microbes, and make food tastier. Representation of the usefulness and specialties of kluwak, fruit, and pucung trees through the language of images (comics, or graphic novels) is just one way to introduce one of the natural riches of the Archipelago. While spreading the ecological message that the beauty of any tree other than the pucung tree is when they are still alive as healthy trees, its aesthetics lies in the community where the trees are aware and can cultivate them intelligently.

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