

**On Cham Ahiér Ethnic Community Brahmanism Transformations
in Ninh Thuan and Binh Thuan Province, Vietnam
(via Life Cycle Rituals Expression)**

**О трансформации брахманизма в этнической общине Чам
Ахиер в провинциях Ниньтхуан и Биньтхуан, Вьетнам
(через выражение ритуалов жизненного цикла)**

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АННОТАЦИЯ. Этническая община Ахиер Чам, проживающая преимущественно в провинциях Ниньтхуан и Биньтхуан, является наиболее многочисленной из общин Чам. Они исповедуют брахманизм. Несмотря на раннее распространение и утрату многочисленных культурных традиций, брахманизм сильно «локализован». В данном исследовании рассматривается эволюция брахманизма в этнической общине Ахиер Чам в провинциях Ниньтхуан и Биньтхуан, Вьетнам, на основе древних брахманистских учений о ритуалах жизненного цикла. Показано, что многие брахманистские ритуалы рождения и совершеннолетия были заменены местными обычаями в общине Ахиер Чам. Патриархальные верования брахманизма

ABSTRACT. The Ahier Cham ethnic community, which primarily resides in Ninh Thuan and Binh Thuan, is the most numerous of the Cham communities that practice other religions. They are Brahmanic. Despite its early introduction and the loss of numerous cultural legacies, Brahmanism has been heavily “localized.” The study examines the evolution of Brahmanism in the Ahier Cham ethnic community in Ninh Thuan and Binh Thuan, Vietnam, based on ancient Brahmanism teachings in life-cycle rituals. It demonstrates that many Brahmanism birth and adulthood rituals have been replaced by indigenous customs in the Ahier Cham community. The patriarchal beliefs of Brahmanism have been radically altered by the matriarchal system. Although there are some

были радикально изменены матриархальной системой. Хотя некоторые следы брахманизма сохранились, например, традиция запрета совершения брачного акта в течение трех ночей, свадебные обряды контролируются матриархальной системой. Наиболее тесно связанные с брахманизмом обычаи — это похороны, особенно идея «реинкарнации и освобождения». Учитывая, что Создатель изображается как «Мать земли По Инынагар», а законы, регулирующие брак и поклонение кутам, являются строгими, брахманизм «чамизированным — локализованным» в региональную религию. Кроме того, исследования показывают, что местные обычаи развивались под влиянием внешних факторов, что привело к появлению характерных культурных нюансов чамской культуры.

КЛЮЧЕВЫЕ СЛОВА. Тямы Ахиер, брахманизм, ритуалы жизненного цикла, культ Кут, матриархальная система, тямский культурный колорит

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traces of Brahmanism, such as the tradition of forbidding the consummation of the wedding night for three nights, wedding rites are overseen by the matriarchal system. The customs that most closely adhere to Brahmanism are funerals, particularly the idea of "reincarnation and liberation." With the Creator portrayed as the "Mother of the land Po Inư Nagar" and stringent laws governing matrimony and Kut worship, Brahmanism was? "Chamized—localized" into a regional religion. Additionally, studies reveal that indigenous customs have developed alongside external influences, resulting in distinctive Cham cultural nuance.

KEYWORDS. Ahier Cham ethnic, Brahmanism, Life-cycle rituals, Kut worship, Matriarchal system, Cham cultural nuance

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1. Introduction

In Ninh Thuan and Binh Thuan (Panduranga), there are roughly 55,000 members of the Cham ethnic group. When compared to other religious groupings of Cham people, the Ahiér Cham (Cham people who practice Brahmanism) are the largest group.

The Cham people who practice Brahmanism refer to themselves as *Ahier*, which is associated with the yang, while the Cham people who practice Bani Islam refer to themselves as *Awal*, which is associated with the yin, under the framework of the “duality union” between the two religious communities. The Bani Islam Cham worship the one deity, the saint Alah (called *Po Awluah (Allah)* by the Cham people), and the angel Muhammad, while the Brahman Cham adhere to the polytheistic doctrines of Hinduism. (*Phan Quoc Anh, 2019, p.108-109*)

From the nation's establishment (192 AD), the Cham people embraced Brahmanism, or Hinduism; other religions, like Bani Islam (Cham Awal), were introduced to them later. Temples, sculptures, Kut statues, and other tangible cultural artifacts are all products of Brahmanism, or Hinduism. The Ahiér Cham group is home to the majority of the oldest intangible cultural artifacts. Despite being referred to as Cham Brahman, the Brahman religion has undergone significant localization or transformation within this society. The study examined the ideas of the universe, gods, life, death, reincarnation, and liberation that are conveyed via the life cycle ceremonies of the Ahiér Cham people with those of ancient Brahmanism in order to identify that transformation.

2. On cosmology

2.1. Creator ideas

The Brahmanical idea holds that man must become one with the “major universe” (Brahman) since he is a “microcosm” (Atman). Brahman is described as the “supreme cosmic spirit” in the Upanishads. As soul or breath, Brahman is also Atman. The force that generates and rules the universe, the source of all life, and the first reality, Brahman is omniscient and almighty. According to Hoang Tam Xuyen, Brahman is “that from which all things are born, that through which all things grow, that into which all things enter after their dissolution.” Therefore, the highest creator god in Brahmanism is Brahma. The goddess Po In Nagar, also known as the “Mother of the Land,” is the creator of the Cham people. As the primary cause of the Cham people's Brahmanic change, this is the largest and most basic distinction. Brahman, the greatest Creator, is a male god who has been transformed into a goddess by the Cham matriarchy. Po In Nagar might have been the first “native” deity to exist. The goddess “Mother of the Land,” Po In Nagar, reappeared to rule over the spiritual life of the Cham people when the Champa state and the Brahman caste vanished. The matriarchy still persists in the entire Cham society today for the same basic reason. Even Nevertheless, for thousands of years, Brahmanism and Bani Islam have been patriarchal religions.

2.2. Yin and yang unified concept

The Cham people refer to the dual unification notion as *tanaow-binai* or *lakei-kamei* philosophy, which is highly consistent and can be simply understood as male-female or male-female. From the Su-

preme Creator, who created the universe, to the tiniest items, including reproductive movements in rites, costumes, offerings, and ritual equipment, it encompasses and regulates everything, both physical and abstract. The majority of people worldwide, particularly those from agricultural civilizations that use wet rice, understand the concept of dual yin-yang union; nonetheless, study has not yet discovered a way to achieve the Cham people's high degree of consistency. But it can be explained that the Cham people combined the fertility beliefs of the rice-growing agricultural people of Southeast Asia with the dual fertility symbol *linga-yoni* of Shivaism, elevating it to the point where it covered and dominated all concepts, from spiritual life to secular objects and phenomena.

2.3. *Of divines*

According to Hoang Tam Xuyen's book *Ten Major Religions in the World*, "the Brahman religion that later developed into Hinduism has up to 300,000 gods." (Hoang Tam Xuyen, 1999, p.189). Southeast Asian peoples, including the Cham, have polytheistic indigenous beliefs. Since both religions share the idea of animism, the Brahman doctrine's foundation is polytheistic or pantheistic, making it simple to integrate with existing religions when it first appeared in Cham society. To this day, the Cham Ahiér people maintain the belief that there are gods in all three strata of the universe (*heaven, earth, and space*).

According to the Ninh Thuan Cham Cultural Research Center, there are currently 116 main gods invited in Cham ceremonies, including "native" gods bearing the mark of the matriarchal regime of the Cham people, such as the Mother

Goddess of the Land—*Po Inur Nugar*, the Father Goddess—the sky *Yang Po*—*Yang Amur*, and kings like the gods worshiped in towers in Ninh Thuan. When gods from ancient Indian Brahmanism were introduced to Champa, they were still worshipped by the Cham people, but they were supplanted by "local" gods or had new names in the Cham language. The Cham people revere God Shiva, known as *Po Ginuer Matri*. Goddess *Bhagavati*, Shiva's bride, was turned into the Mother Goddess of the Land (*Po Inur Nugar*), while the divine cow *Nandil* became *Kapil*, a character in Cham folktales¹. *Yang Apui*, the fire god, succeeded *Agni*. Furthermore, the Cham people have several "indigenous" gods, including the god of Mound, mountain god, sea god, earth god, mother goddesses of the land, ancestor gods, profession gods, and dozens of person gods associated with historical and cultural events. The primary gods of Brahmanism are now exclusively seen on Cham sculptures in Central Vietnam. This demonstrates that Brahmanism, the Champa dynasty's official religion, represented the elite class and is associated with the royal culture. Although individuals are required to observe theocratic rules (worshiping cows and the fertility symbol *linga-yoni* of Shivaism), they nevertheless practice their indigenous traditions.

The Cham Ahiér's life cycle rites therefore hardly ever invoke the names of the Brahman gods. Along with the Indian gods, the Cham human gods are always requested to participate in burial rites or Kut ceremonies: As for *Po Pan*, *Po Klaong Girai*, *Po Ramê*, *Po Sah Inur*, *Po Klaong Kasat*, *Po Cei Tathun*, *Po Tang*, *Po Gihlau*, *Po Riyak*, and *Po Dam*... The Cham people's old human gods' existence and accomplishments are honored by the masters'

singing and playing of the Kanhi (Kadhar) instrument. In addition, numerous female goddesses are invited, including the Lady of Maram (*Po Inur Nugar Hamu Ram*), the Lady of Ba Rau (*Po Inur Nugar Murau*), and the Lady of Taha (*Po Inur Nugar Taha*)².

3. Life cycle rituals

According to Brahmanism, humans must go through four phases³. During the four periods, humans must strive for four vital goals:

- 1/ *Dharma* (obligation, morality).
- 2/ *Artha*, which means wealth and success.
- 3/ *Kama* (love).
- 4/ *Liberation* (Moksha).

From conception to release, humanity must undergo numerous rites and complex sacrifices over those four times. Perhaps no other religion has as many rituals for humans as Brahmanism. A.L. Basham estimates that up to 40 rituals (*Sanshora*) occur throughout a person's life (A.L. Basham, 1969, p.171-200). There are various restrictions on exceedingly elaborate sacrifices in ancient Brahmanism, with "family sacrifice" including up to 12 different sorts of rites for *humans*. (Hoang Tam Xuyen, 1999, p.175).

3.1. Birth stage

When a kid is not yet born, Brahmanism prescribes three rituals: one to aid conception (*Garbhadhana*), one to aid birthing (*Punsavana*), and one to keep the embryo in the womb till full term (*Simantonnayana*). When the infant is born, the birth ritual (*Giataharma*) is performed prior to

the cutting of the umbilical cord. During that rite, the priest recites a *mantra* into the infant's ear, places honey in the child's mouth, and names the child. The next significant ritual is the first solid meal ceremony (*Annaprasana*), which occurs when the kid is 6 months old.

When the child reaches the age of three, a hair-cutting ritual is performed, leaving only a tuft of hair on the head. It should be noted that all of the ceremonies listed above are only conducted for boys (A.L. Basham, 1969, p.180). According to Indian Brahmin custom, the second birth ceremony (*Upanayana*) is only done by the three upper castes (*Brahmin, Kristrya, and Vaissya*). The Brahmin child is performed at the age of eight, the Kristrya child at eleven, and the Vaisya child at twelve. Following this rite, the kid is recognized as a full member of society and given the sacred cord (*Yidjnopavita*). This ritual is not a sexual maturity ceremony in Islam, such as circumcision (for men) or chastity (for women). Following the ceremony, the child begins his or her educational journey.

However, the current Cham Brahmins' life cycle rites do not include any rituals for children as specified by the Brahman philosophy. The taboos in Cham birth rituals are primarily indigenous traditions. Some birth rituals may be indigenous Cham culture or inspired by other ethnic groups, such as the ceremony to worship the mother giving birth, the custom of lying on fire, the ceremony to offer to ancestors, and the wearing of the "*Ikak tamrak*" amulet to ward off evil spirits. These rites are shared by several ethnic groups in Southeast Asia.

¹ Авторы Many authors. *Cham folk tales*. National Culture Publishing House, Hanoi 2000, p.98

3.2. Coming of age ceremony

According to Brahmanism in India, the child (only boys) studies the *Vedas* after executing the sacred thread rite (*Yidjnopavita*). After finishing the studies, he is purified, becomes a *Snatara*, and returns home to marry. Brahmanism holds that marriage has three primary purposes: to fulfill religious responsibilities through sacrificial rites, to have children to continue the family line so that when he dies, he can rest in peace in the hereafter, and to have sexual pleasure. The Ahiér Cham, on the other hand, do not regard maturity rituals as important. While Brahmanism dictates that birth and maturity ceremonies are primarily for boys and that the husband's job is to carry on the family line and execute sacrificial rituals, the Cham Brahmanians place these responsibilities on the wives. *Obviously, Cham matriarchy has radically altered patriarchal Brahmanism*. It is one of the issues resulting from Brahmanism, which creates disparities between Indian culture and Cham cultural subtleties.

3.3. Wedding ceremony

The Cham wedding ceremony is entirely managed by the matriarchal system, with the

bride's family taking the initiative to marry a spouse for their daughter. All of the ceremonies, including the engagement ceremony and wedding ceremony, as well as the worship rites, are indigenous. It is worth noting that the bride and groom are not permitted to consume anything throughout the three days of the wedding. Many researchers have noticed the lovely aspect of "forbidding consummation for three nights" in the Cham wedding ritual, but the origin of this custom has not been explained.

According to the research, this is a tradition left by the Brahmanism doctrine: "Brahmanism regards sex as sacred. The newlyweds are not permitted to have intercourse during the wedding's three days." (*Hoang Tam Xuyen, 1999, p.171-201*). Thus, the Cham Ahiér people's wedding ceremony contains traces of Brahmanism.

3.4. On Funerals and the Concept of Reincarnation and Liberation

3.4.1. On reincarnation and liberation

Only the Cham Ahiér's funeral has the greatest Brahmanical traditions among the life cycle

² According to legend, the above goddesses are all daughters of the Lady of the Land Po Inur Nugar. In Cham language, Po means lord, Inur means mother, and Nugar means country. The following names are the place names, the places where the daughters of the Lady of the Land Po Inur Nugar are worshiped (author).

The four periods are:

- From the moment the sacred band is worn, the child is considered to have become a Brahmanian. From then on, the child must live and study at the home of the teacher of scriptures. - When he has understood the *Vedas*, the child (who has grown up) returns home to get married. From now on, the boy has become the "master of the house" (*giuhastha*).
- When he is old and has descendants to continue the family line, the man leaves home to practice asceticism in the forest to become a *vanaprastha* with the purpose of meditating, repenting, and cleansing the soul from all worldly ties.
- When he is old and weak, he returns, becoming a homeless wandering old man. (*A.L. Basham. The wonder that was India, 1999*).

ceremonies. The concept of “reincarnation and liberation” from the Vedic time before the Common Era is still present in the Cham Ahiér's mind in the twenty-first century.

The Vedic liberation theology has three stages. The *Upanishads* express the liberation idea of rebirth from the third stage of *Brahmanism*. During this stage, people must cultivate their true selves in order to eventually perfect them. When the true self is perfected, *Atman* becomes *Brahman*, which signifies liberation from reincarnation. Later, Buddhism and Jainism adopted reincarnation and freedom as their ideology, further developing the concept of “karma and reincarnation.”

The notion of “karma and reincarnation” is not expressed in the Cham people's burial rites. This is mirrored in the Cham people's distinction between burial rites for various sorts of deceased individuals. If a person dies “completely,” or “normally, well,” they will have a grand cremation ceremony, their souls will be liberated, and the 9 pieces of frontal bones (after cremation) will be placed in the main kut tomb of the family (*Mutai siam* are cases of complete death, death at home, death at the age of 50 or older, having a family, and marrying a person of the same ethnicity and religion). In the mortal world, if a person dies “incompletely” (as *Mutai bhao*—not meeting the above criteria for “complete” death), the soul will not be liberated and will be placed in the cold auxiliary kut outside the family kut tomb to return to the ancestral gods, regardless of how well they lived. Thus, unlike the post-Vedic sects, the Cham Ahiér's life and death do not follow the law of “cause and effect” and are not influenced by

“karma” or “retribution”.

3.4.2. Class distinction

In today's Cham society, the separation between classes has nearly vanished, just the term remains. However, in burial rites, that concept is still obvious, as funerals for clans by class have been regulated since ancient times. No matter how wealthy the deceased is today or what rank they have in the new society, if they are from a low-class clan, they will be given tiny funerals or even buried rather than burned. Burial, according to Cham beliefs, implies going to Hell. Many people are impoverished, but when they die, they are given a grandiose burial and released if they belong to a high-class clan. As is well known, Brahmanism is a religion with strict class inequalities, and its dogma is designed to protect the clergy's interests. When this ideology was adopted into Champa society, it became a tool for the Champa dynasties to maintain their dominance and preserve the nobility. Caste differences eventually dissolved, as did royal and divine power. Today, caste distinctions exist solely in funeral ceremonies presided over by Brahmin priests.

3.4.3. About sacrifice

Brahmanism contains several spells, charms, and extremely complex sacrifices. This trait also has a significant impact on the lives of the Cham people. Hundreds of festivals and sacrifices held throughout the year, along with a series of spells, charms, and hefty offerings subject to rigorous laws, demonstrate the Vedic period's strong influence (*Doan Chinh, 1999, p.62*). Cham Brahman dignitaries must memorize a large number of sacrificial scriptures, which consist of a sequence of

intricate and abstract rites, motions, and spells that can be difficult to grasp at times. The craftspeople must be familiar with hundreds of funeral songs, drawings of charms, prayers, incantations, and ritual gestures. These complicated rites are carried out in accordance with a precise and consistent set of rules, primarily based on ancient Cham literature. Many dignitaries performing the event know it by heart, but not all ceremonies have a complete comprehension of its significance. When queried, the masters respond, "As in the past, so it is now." Scientists unanimously agree that philosophical ideas and beliefs concerning spiritual life are the most durable. Perhaps this explains why, despite numerous periods of cultural disturbance, Brahmanism continues to dominate the Cham Ahiér people's spiritual life.

3.5. Kut worship

Brahmanism in India does not have the custom of keeping 9 pieces of the frontal bone after cremation like the Cham Brahmanism of today. Brahmanism's teachings stipulate, "After cremation, everyone bathes, and three days later, the unburned bone fragments and ashes are collected and thrown into the Ganges River." (*Hoang Tam Xuyen, 1999, p.198*). Chinese documents also tell us that in the past, the Cham people did not have the custom of keeping 9 pieces of the frontal bone to enter Kut: "... When carrying the dead near a river, they stop crying; they put the body on a pile of firewood and burn it, then collect the ashes and put them in an earthen jar, throw them into the river, then everyone goes home, avoiding saying a word, perhaps so that the soul of the dead cannot find its way back." (*Maspero, 1928, p.27*). Thus, the custom of entering Kut and worshipping Kut of the Cham Brahmanism is not a belief of Brahmanism and did not

exist before. So where did the Cham people's custom of worshipping Kut come from? When did it start? Mr. Su Van Ngoc in the article *The Funeral of the Thuan Hai Brahman Cham People* believes that "the custom of cutting off heads when burning the dead originated from the story of Um Murup, son of King Rum Muk, a Brahman prince who was fascinated by Islam and betrayed his father and was later beheaded as an example." (*Su Van Ngoc, 1978, p.183*).

According to numerous historical documents, there was no practice of bringing bones back for devotion during the Champa period. After cremation, the ashes were scattered in both major and small rivers and streams. If they belonged to monarchs, they were placed in the sea; if they belonged to rich nobles, they were placed in rivers; and if they belonged to poor laborers, they were placed in streams, ditches, or ponds. According to mythology, from King Po Auluah to Po Klaong Girai, kings' bones were buried in towers, while nobles' bones were deposited in mausoleums. Poor laborers' ashes were still interred in water. The bones of poor people were not buried in cisterns under stone symbols for worship until Po Klaong Girai ascended the realm, thanks to an occurrence immortalized in the Cham legend about the "Lac King" (Po Klaong Girai). According to the explanations provided above, ancestor worship is a spiritual necessity for Southeast Asian inhabitants who follow indigenous cultural practices. Worshipping kut as a symbol of the deceased is an ancient ancestor worship belief of the Cham people, which was restored to strengthen the community and meet the demand for ancestor worship in subsequent generations. Research suggests that the practice of worshipping kut stems from Hinduism.

4. Conclusion

According to certain similarities between pre-Brahmanism and Brahmanism features expressed in the Cham Ahiér's life cycle ceremonies, Brahmanism is no longer an original religion but has been "Chamized/Indigenized" into a form of ethnic religion, or a local religion. This religion has no dogma or canon law, but it does have stringent laws for the matriarchal structure, particularly in Kut worship. For example, to be emancipated and enter Kut to the ancestors, one must undergo all transitional ceremonies, have a husband and wife, die "completely," and perform a complete funeral ceremony. The Cham people voluntarily respect these regulations. That demonstrates the Cham Brahman community's faith in its own religion. The Cham Brahman society has been firmly established due to the severe and persistent laws of a new sort of religion among the Cham people.

Brahmanism, often known as Hinduism, later entered Champa and was venerated by several kingdoms and sects, and artifacts of Indian gods can still be found across Central Vietnam. However, for the Cham people, Brahmanism, with its caste-protecting traits, mostly reached the royal class, nobles, and Brahman clergy, while the lower classes retained their indigenous traditions. Brahmanism did not become a universal religion in Cham civilization. One half was walled off to world Brahmanism; in the other, as the royal class and aristocracy disappeared, Brahmanism gradually lost its place in Cham culture. That was the social environment in which indigenous traditions might emerge and dominate the people's spiritual lives. Exogenous Brahmanism was combined with endogenous indigenous traditions throughout the localization

process. The Cham people have filtered and eliminated what is not appropriate for the people's lives from the Brahman ideology and replaced it with indigenous aspects acceptable by the Cham people, resulting in a national religion and a local religion. This religion is responsible for the ideals that define the unique, rich, and diversified traditional Cham culture.

References

1. Bui Khanh The (Editor). *Cham — Vietnamese Dictionary*. Social Sciences Publishing House, Hanoi, 1995, p.219.
2. Hoang Tam Xuyen (Editor). *Ten Major Religions in the World*. Translated by Duong Thu Ai and Phung Thi Hue. National Political Publishing House, Hanoi, 1999, p.110.
3. Many authors. *Cham folk tales*. National Culture Publishing House, Hanoi 2000.
4. A.L. Basham. *The wonder that was India*. Russian translation, London 1969, p.171-200.
5. Doan Chinh. *History of ancient Indian philosophy*. Youth publishing house, 1999, p.62.
6. Maspero. G. L. *Kingdom of Champa (Le royaume du Champa)*. Paris, 1928. Translated by Dao Tu Khai, p.27.
7. Su Van Ngoc. *The Funeral of the Thuan Hai Brahman Cham People*. In: *Ethnological issues in South Vietnam*, volume 2, book 2, Ethnic Department — Institute of Social Sciences in Ho Chi Minh City 1978, p.183.

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