Local Shit Production cycle Research

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Introduction

The Netherlands is facing a growing manure crisis. Every year, Dutch livestock farms produce approximately 68.6 million tonnes of manure, with around 55 million tonnes coming from cattle. Due to the phasing out of the European Union's manure derogation policy, the country is expected to experience a nitrogen surplus of 95 kilotonnes annually by 2026. This situation presents not only an ecological challenge but also places significant financial and logistical pressure on farmers, as disposal costs rise and effective solutions remain limited.

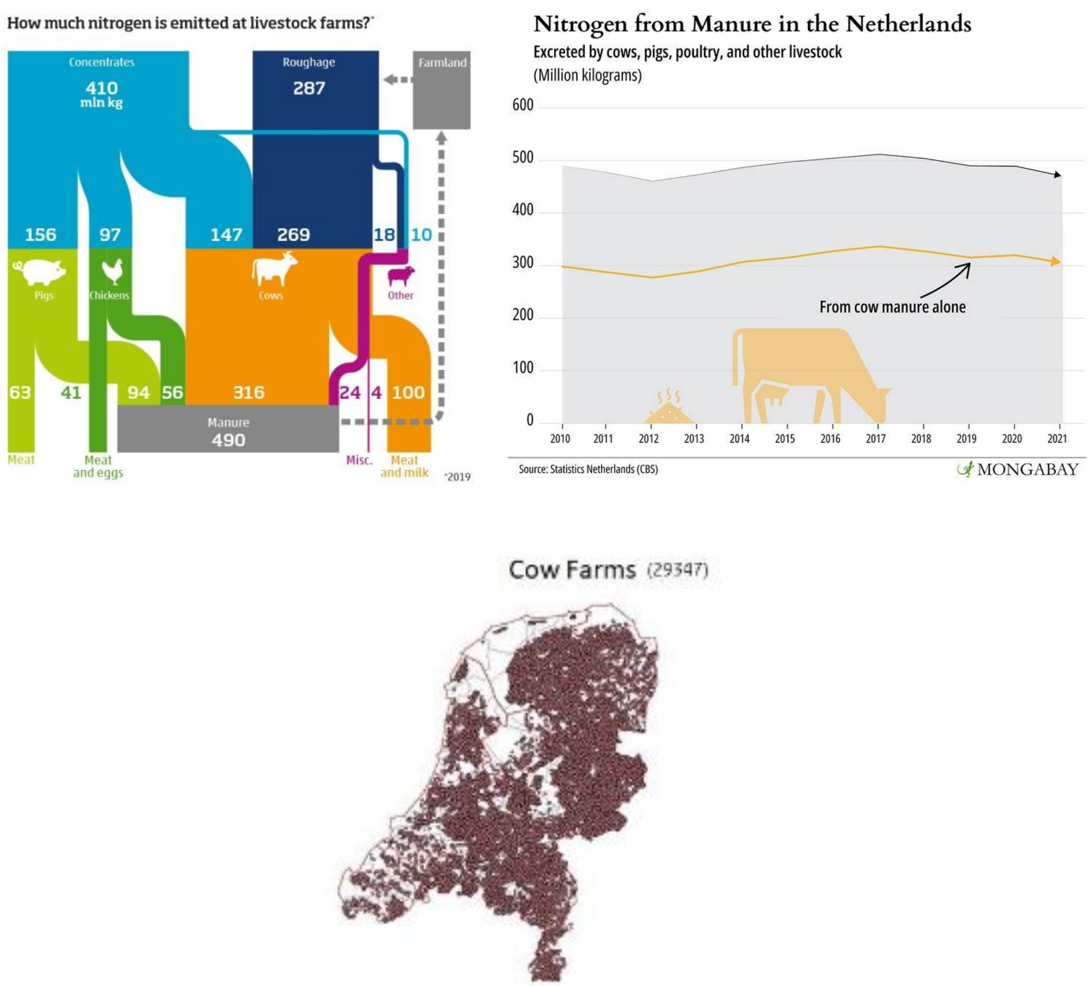

Figure 1 ~ Nitrogen from Cow Manure and amount of cow farms

What is the solution?

Local Shit emerged from the urgent need to reconsider how we manage this abundant and often problematic resource. Instead of viewing cow manure purely as waste, this project explores its potential as a valuable material for the construction industry.

Initially developed by designer Antonia Vincenza as part of her graduation research, Local Shit began as an investigation into the use of cow manure as a base for natural plaster. The idea is grounded in traditional building practices found in parts of Asia and Africa, where clay and dung mixtures have long been used for their water-resistant and insulating properties. During Dutch Design Week, the project gained momentum and expanded through a collaboration with biomimicry architect Lydia Fraaije and a team of Honours students from Inholland University of Applied Sciences (Niels, Semih, Mara, Suheyla).

Together, the team set out to translate this ancient yet underappreciated method into a viable and sustainable material for contemporary use. The resulting stucco mixture consists of four simple ingredients: sand, clay, water, and fresh cow manure. This report presents the full scope of our research process, including recipe development, physical testing, material performance, and potential production systems. All of this was guided by principles of biomimicry, local resource use, and low-impact design.

Through hands-on experimentation and iterative testing, we aimed to demonstrate that manure-based plaster is not only feasible but also holds real potential as a sustainable building material. Our intention is to integrate this waste product meaningfully into architecture and construction practices, offering both environmental and economic benefits. By doing so, we align with circular design strategies, reduce reliance on conventional high-emission materials, and challenge conventional notions of material acceptability.

This report outlines our methods, findings, and proposals for integrating manure-based stucco into different production and construction contexts. Whether used on-site, produced at the farm level, or scaled up within local networks, this material invites a new kind of value chain that reconnects architecture with agriculture and waste with design.

Ultimately, this project is not just about manure. It is about rethinking our relationship with waste, building in harmony with nature, and discovering the potential of overlooked materials to shape a more resilient and regenerative built environment.

But how does it work?

The traditional process of making stucco involves four key ingredients: sand, cement, hydrated lime, and water. These components are combined and mixed until they reach the consistency of wet peanut butter.

Similarly, the cow manure-based stucco developed in this project as already mentioned consists of four ingredients: sand, clay, cow manure, and water. Despite the alternative materials, the overall application process remains identical to conventional stucco. This is one of the key strengths of the concept, its simplicity and compatibility with established methods.

The steps are straightforward:

- Mix
- Apply
- Smooth
- Allow to dry
- Paint

This seamless integration with existing stucco practices makes the manure-based alternative not only sustainable but also highly practical for real-world use.

Physical Testing and Colouring Process

Rather than relying solely on theoretical validation, the project prioritized hands-on testing to evaluate the effectiveness of the cow manure-based stucco. Additionally, at the request of Lydia from Fraai Architecture, research was conducted into possible methods of coloring the stucco, as its natural grey-brown appearance may not suit all aesthetic preferences.

The initial objective of the physical testing phase was to understand the stucco mixing process and to explore practical application techniques. The aim was to experiment with different materials and surface finishes to evaluate potential outcomes. The plan for the first visit was as follows:

1. Wood fiber board (houtvezel) with manure-based stucco; paint applied afterward.
2. Stucco board (stucplaat) with manure-based stucco; paint applied afterwar.
3. Wood fiber board with manure-based stucco.
4. Stucco board with manure-based stucco.
5. Stucco board finished with a brush on the manure-based stucco.
6. Wood fiber board finished with a brush on the manure-based stucco.

The primary goal was to compare traditional stucco panels with those using more natural materials, such as wood fiber (houtvezel). Additionally, the use of a brush finish was tested to assess its impact on surface texture.

The following steps outline the general process for preparing manure-based stucco:

1. **Clay Preparation ~** Begin by breaking the dry clay into smaller fragments and gradually adding water to rehydrate it. Note: It is essential to avoid overwatering the clay, only a minimal amount is needed to achieve a malleable consistency.
2. **Base Recipe (per Antonia Vincenza's formulation) ~** Once the clay is adequately softened, combine the materials in the following proportions:
    a. 1 part clay
    b. 2.5 parts sand
    c. 3 parts fresh cow manure
3. **Initial Mixing ~** Add the sand to the prepared clay and use an electric mixer to blend the two components thoroughly.

4. **Final Mixing ~** Incorporate the fresh cow manure into the clay-sand mixture. Continue mixing with the electric mixer until the mixture reaches a consistency similar to wet peanut butter.
5. **Application Readiness ~** At this stage, the manure stucco is ready for application.

As the standard manure stucco mix results in a natural grey-brown color, a small portion of the mixture was set aside to test the potential for color modification using natural dry leem (clay-based) mineral paint powder. This type of pigment typically requires mixing with water and resting before application. However, given the wet consistency of the stucco, the idea was to integrate the powder directly into the mixture to potentially soften or alter the base color.

Despite adding a substantial amount of leem powder to a sample of the wet stucco, the resulting color remained largely unchanged, still grey-brown in tone. This suggests that achieving noticeable pigmentation through this method would require a significantly higher quantity of pigment, which may be cost-prohibitive and unsustainable in terms of material use. Alternatively, new methods of pigmentation may need to be explored, although this lies beyond the current scope of the project.

Please find below the observations and results from the physical testing, including remarks made after checking on the samples once they had dried:

1. **Houtvezel: Before vs. Dried and Painted**
   After the stucco had fully dried, the mineral paint powder was prepared according to standard procedure, mixed with water and rested, then applied in two coats with a brush over the dried stucco surface.

Figure 2 ~ 1.Houtvezel Before vs Painted

Results: No cracking or shifting, smooth finish and easily paintable.

2. **Stucplaat:** Before vs Dryed and painted

Figure 3 ~ 2. Stucplaat Before vs Painted

Results: No cracking occurred, but a slight bubbling texture appeared, likely due to unmixed clay lumps, as achieving a smooth consistency was rather difficult.

3. **Houtvezel:** Before vs Dried

Figure 4 ~ 3. Houvezel Before vs Dried

<u>Results:</u> Again, similar issue to #2, although was already visible in the wet panel, confirming the clay suspicion.

4. **Stucplaat:** Before vs Dried

Figure 5 ~ 4. Stucplaat Before vs Dried

<u>Results:</u> Similar “bubbling” clay issue from #2 & #3

5. **Stucplaat:** Before vs Dried

Figure 6 ~ 5. Stucplaat with Texture Before vs Dried

<u>Results:</u> This was the first sample to show signs of cracking. It also marked the initial attempt to introduce texture using a broom and embedded flowers in the bottom left. While the texture application was successful, cracking occurred.

6. **Houtvezel:** Before vs dried

Figure 7 ~ 6.Houtvezel with Texture Before vs Dried

<u>Results:</u> A more forceful use of the broom created a pronounced texture, which is clearly visible. However, this approach again led to cracking.

Building on the insights from the initial tests, the second round focused on refining techniques and exploring material variations. The following elements were tested:

- **Painting ~** As seen on boards #1 and #2, applying two coats of mineral paint significantly enhanced the color. The process was straightforward and efficient, with sun drying taking only minutes. Note: drying times will vary under indoor or less favorable weather conditions.
- **Clay Preparation ~** To address issues with clay lumps in the first batch, additional effort was made to thoroughly break down and hydrate the clay. Adding more water greatly improved the consistency, resulting in a noticeably smoother and more workable mixture.
- **Non-Biological Cow Manure ~** This batch used manure sourced from a conventional dairy farm. This allowed for a comparison between different manure types and their impact on the mixture's performance.
- **Dried Cow Manure ~** Despite Antonia's note that dried manure may reduce water resistance, it was included for testing. Its ease of storage and supply chain advantages make it worth evaluating for future use.

A few pictures from the second experiment day:

Figure 8 ~ Few pictures of experiment day #2

Figure 9 ~ Results of experiment day #2

Results from the second experiment day:

- **Improved Clay Refinement ~** Enhanced clay processing significantly improved the workability and final finish. The smoother consistency confirmed that the earlier batch had been too clumpy, as the second panels showed a much finer surface.
- **Texture Experimentation ~** Texturing was reattempted using leaves and branches. The patterns were clearly visible and, importantly, no cracking occurred, indicating better material performance and application technique.
- **Non-Biological Manure ~** This manure contained visible organic remnants (e.g., corn), had a distinct color, and emitted a stronger odor. Despite these differences, it behaved similarly in the mix, bonded well and was easy to work with, suggesting it performs comparably in stucco applications.
- **Dried Manure ~** This variant had virtually no odor and, according to Antonia Vincenza, might lack water resistance. However, a basic water test showed no significant difference compared to fresh manure. To validate this, further physical and chemical testing would be valuable to determine whether fresh manure is truly necessary.

With the physical product now proven to be effective, the next step is to explore practical pathways for scaling and implementation. To bring this stucco solution to market, a logistical framework must be developed, one that enables farmers, contractors, and consumers to participate in a reliable, sustainable production and distribution chain. The following section outlines key considerations and potential models for establishing this chain.

Production Chains

To ensure this stucco product becomes a practical and impactful solution, a well-defined logistics chain, from raw material sourcing to application, is essential. In today's market, both producers and consumers rely on streamlined access; if either side faces obstacles, the viability of this solution to the nitrogen and manure crisis is severely compromised.

Moreover, since this product aims to address environmental issues, it is critical that the production and distribution process align with principles of environmental efficiency and low-impact operation. The goal is not only to create a sustainable product but to ensure the entire system around it reflects that same commitment to ecological responsibility.

Fortunately, Antonia Vincenza has already outlined three potential production pathways. The following section will examine each of these models through the lens of Biomimicry's Life Principles to help determine the most effective and sustainable route forward:

1. Individual On-Site Production
2. Small-Scale Farm-Based Production
3. Large-Scale Centralized Production

Individual production on site

For the individual production on site, Antonia envisioned the following:

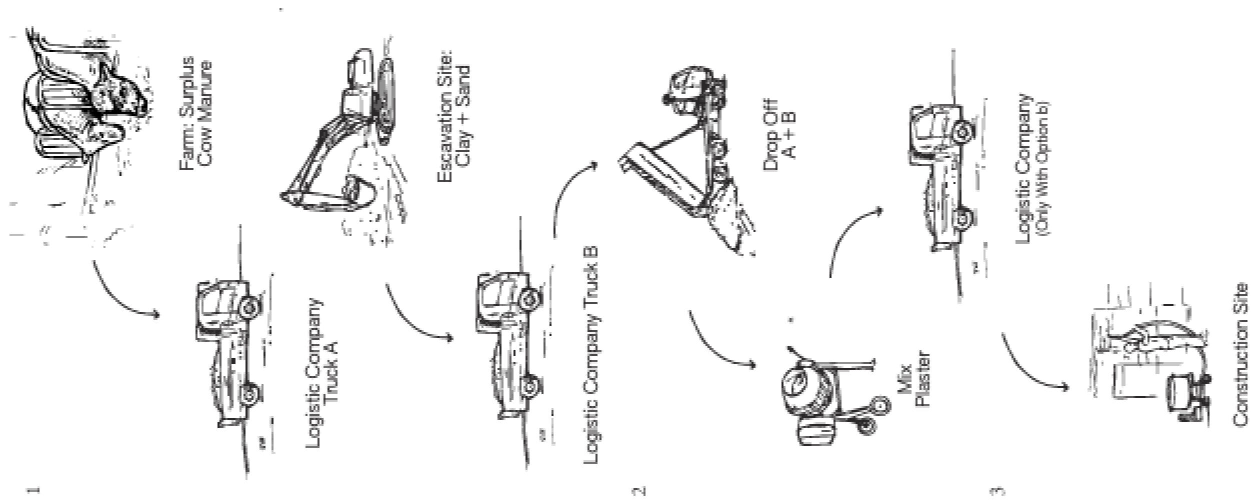

Figure 10 ~ Individual production on site

This model truly embodies the idea of "local production," requiring minimal structural change from any party involved. Whether the material is collected directly from a farm or a praxis, the process is simple and adaptable. Contractors or logistics providers can treat pickup as they would any other material run, without needing specialized handling or coordination.

One of the key advantages of this approach is its low barrier to entry. It can be implemented almost anywhere, and in the event that demand ceases, no stakeholder suffers significant losses from upfront investment.

Antonia Vincenza highlighted the following:

Pros:

- Localized production
- On-demand mixing and use

Cons:

- Lack of an existing system
- Increased logistical coordination

Interestingly, what Antonia identified as a disadvantage, logistical complexity, can, from another perspective, be viewed as a strength. The decentralized nature of this model promotes flexibility and resilience, particularly in regions with varying infrastructure or scale.

Small production on Farm

For the small production on farm, Antonia envisioned the following:

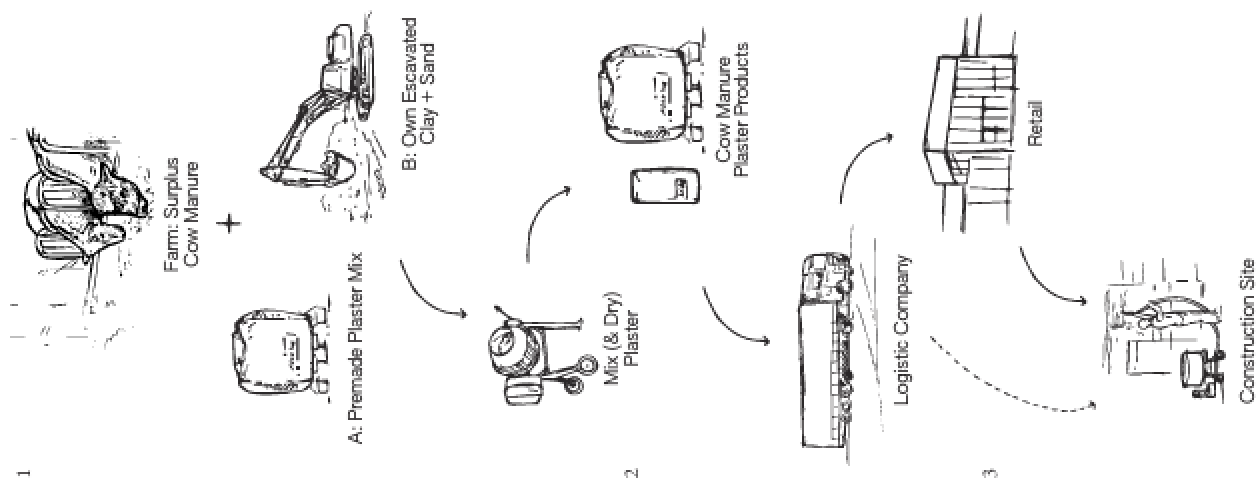

Figure 11~ Small production on Farm

This model represents a step toward commercialization, with production taking place directly on farms. While promising, it introduces new challenges, primarily for the farmer, who is now expected to invest something already in short supply: time. Setting up a reliable, small-scale production system also requires space, equipment, and potentially financial resources.

A key issue with this approach is manure freshness. Since the stucco relies on fresh manure for optimal properties (e.g., waterproofing), maintaining freshness becomes problematic when the product is intended for storage or retail. This limitation adds complexity to packaging, storage, and shelf life.

As Antonia Vincenza outlines:

Pros:

- Less permits needed
- Less logistics
- Framers can sell products
- Short process – less (ammonia emissions)

Cons:

- No existing system
- If dried – plaster looses (a part of its) waterproofing abilities

One particularly compelling point is the potential for farmers to profit from selling the stucco. However, this raises critical questions:

- What level of investment is required for a farmer to break even? And more importantly, is it economically viable to scale up without external support or subsidies?
- These financial and logistical questions must be addressed before this model can become a realistic path for widespread adoption.

Large scale production

For the large-scale production, Antonia envisioned the following:

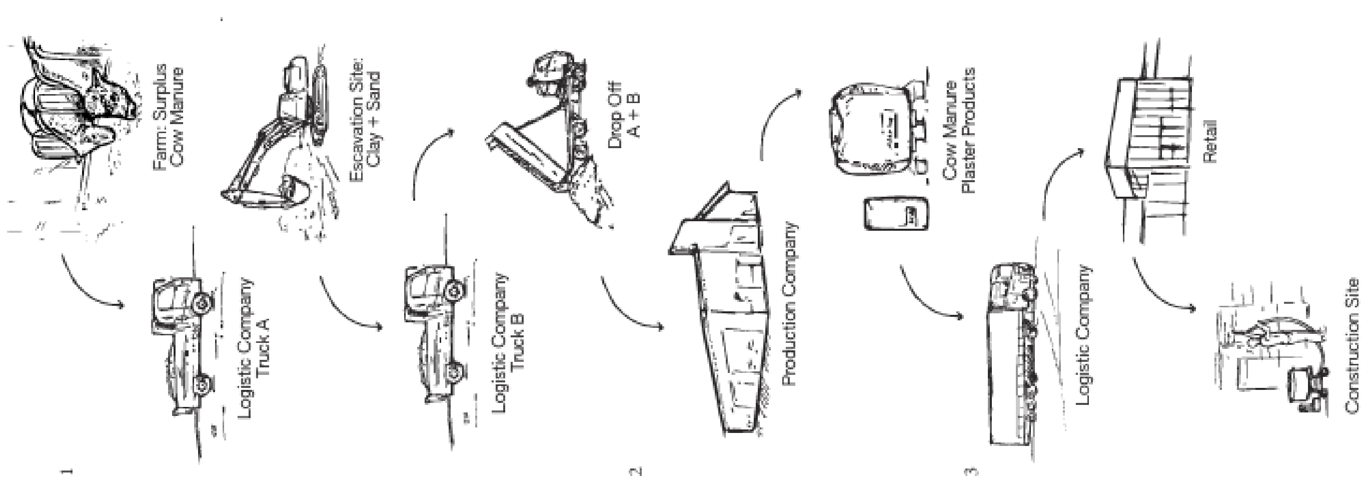

Figure 12 ~ Large scale production

This model moves the process toward full industrialization, significantly distancing it from the concept of "local shit" While it benefits from economies of scale and can integrate into existing industrial systems, it raises serious questions about feasibility, sustainability, and alignment with the original goal, offering a low-impact, environmentally restorative solution to the manure and nitrogen crisis.

Key concerns include the scale of logistics required, the centralization of production, and the environmental cost of transporting both raw and finished materials. Additionally, there are fundamental questions about demand: Is there enough ongoing construction, particularly housing, in the Netherlands to justify such an operation? And where would such a facility be located without introducing new environmental or zoning conflicts?

Antonia Vincenza outlined the following:

Pros from Antonia:

- Works in existing system
- Big scale solution
- Easy for farmers

Cons from Antonia:

- Need of permits
- More logistics
- Longer process – more (ammonia + methane emissions)

While industrial production may seem efficient on paper, it risks undermining the original intent of the project. Rather than solving the manure crisis, this approach may simply shift the problem into a new form, centralized, high-emission, and disconnected from local communities

Comparing to Life principles

While the previous section outlined three potential production models, it also surfaced more questions than definitive answers. To move forward effectively, the focus must shift to identifying the most viable chain, one that supports farmers, serves consumers and contractors, and genuinely contributes to solving the manure crisis (mestcrisis).

To assess each option holistically, the three chains will now be evaluated and ranked using the Life Principles of Biomimicry. These principles offer a nature-inspired framework for sustainable design, focusing on systems that are adaptive, resilient, resource-efficient, and regenerative.

But Before We Go Too Deep Into the Shit Again…Let's first take a moment to define the *Life Principles* of Biomimicry:

1. Adapt to change
    a. Maintain Integrity through self-renewal
    b. Incorporate diversity
    c. Embody Resilience
2. Be locally attuned and responsive
    a. Use readily available materials and energy
    b. Cultivate cooperative relationships
    c. Leverage cyclic processes
    d. Use feedback loops
3. Integrate development with growth
    a. Self-organize
    b. Build from the bottom up
    c. Combine modular and nested components
4. Be resourceful with material and energy
    a. Fit form to function
    b. Recycle all materials
    c. Use low energy processes
    d. Use multi-functional design
5. Use-life-Friendly chemistry
    a. Employ Elegant Processes
    b. Use a Small Subset of Elements

    c. Do Chemistry in and with Water
    d. Break Down into Benign and Useful Constituents
6. Evolve to survive
    a. Replicate Strategies that Work
    b. Integrate the Unexpected
    c. Reshuffle Information

	Individual production on site	Small production on Farm	Large scale production
Adapt to change	✓	✓	✓
Be locally attuned and responsive	✓	✓	x
Integrate development with growth	✓	✓	✓
Be resourceful with material and energy	✓	x	x
Use-life-Friendly chemistry	✓	✓	x
Evolve to survive	✓	✓	x

** The following section does not present a definitive, research-backed conclusion. Instead, it reflects the perspective of honours student, developed through coursework, masterclasses, and critical engagement with the topic. The aim is to apply learned principles in an informed and thoughtful way to propose the most appropriate solution. ****

Based on the results of the table the ranking for cycles is as follows:

1. Individual production on site
2. Small production on Farm
3. Large scale production

To clarify how and why each production chain has been ranked, the following section outlines the reasoning and motivation behind each evaluation and its potential to support a sustainable, practical, and impactful solution to the manure crisis.

Individual production on site

- Adapt to change:
  - Less/no dependency on supply chains
  - Can produce what is need, no overshoot or waste
- Be locally attuned and responsive:
  - Uses local cow manure, sand and clay
  - Encourages cyclic processes
  - Requires minimal transportation or logistics
- Integrate development with growth
  - Self-organized
  - Flexible production
  - Each production site can act independently and produce to its desire
- Be resourceful with material and energy
  - “manual” mixing
  - Minimal transportation
- Use-life-Friendly chemistry
  - All local products and no additives, material is what it is
- Evolve to survive
  - Can be implemented anywhere near farms, clay and sand.
  - No real investment cost
  - Can stop/start at any time
- Trade-offs:
  - Quality and batches may vary

Small production on farm

- Adapt to change:
  - Some reliance on supply chain
  - Demand increase however can mean heavier labour and resources for production
- Be locally attuned and responsive:
  - Uses local cow manure, sand and clay
  - Encourages cyclic processes
  - Requires transportation or logistics
- Integrate development with growth

    - Self-sufficient business
- Be resourceful with material and energy
    - Over production and waste more prone
- Use-life-Friendly chemistry
    - All local products but difficult to store
- Evolve to survive
    - Easy to get going, but does require investment costs
- Trade off:
    - More transportation
    - Investment costs
    - More wasteful

Large scale production

- Adapt to change:
    - Heavily dependent on supply chain
- Be locally attuned and responsive:
    - No longer local
- Integrate development with growth
    - Efficiency of industrial production
    - Limited by production line and supply chain for demand
- Be resourceful with material and energy
    - High energy use
    - Alot of transportation and logistics
- Use-life-Friendly chemistry
    - More prone to additives or chemical additions to increase yield and production time to increase shelf life
- Evolve to survive
    - Not quick to adapt to demand changes
- Tradeoffs:
    - Even quality production

To summarize, individual on-site production aligns most closely with the principles of sustainability, adaptability, and locality. It supports decentralized, flexible application while minimizing environmental impact. Small-scale farm production represents a balanced middle ground, maintaining local engagement while introducing light structure and scalability. Finally, large-scale industrial production shows the weakest alignment with nature's principles, prioritizing efficiency and profit over ecological and systemic integrity. It risks recreating the very issues the product aims to address.

With the physical product successfully tested, two distinct forms of cow manure have been evaluated:

- Wet/Fresh Manure – Collected within 5 days of excretion.
- Dried Manure – processed into a dry, soil-like consistency.

These two variants play a crucial role in determining not only the stucco's performance but also its logistical feasibility. The next section will compare their respective advantages, limitations, and implications for the proposed production chains.

During a meeting with Antonia Vincenza, it was emphasized that fresh manure is the preferred input due to its superior waterproofing properties compared to dried manure. However, its limited shelf life introduces logistical challenges when developing a reliable "farm-to-wall" supply chain. In contrast, dried manure offers flexibility through storage, making it a more practical material for longer-term planning and commercial scalability. Given these characteristics, two manure types align particularly well with two corresponding production models:

- Fresh Manure → Individual On-Site Production
    - Due to the short freshness window, individual production at or near the point of use makes the most sense. This model ensures that:
        - Contractors can source fresh manure directly from nearby farms.
        - Farmers are not burdened with additional processing or infrastructure.
        - The stucco retains its optimal waterproofing qualities.
    - This highly localized approach supports efficiency, minimizes emissions, and leverages the strength of the material at its most effective stage.
- Dried Manure → Small-Scale On-Farm Production
    - The ability to store dried manure makes it suitable for small-scale farm-based production. In this model:
        - Farmers can pre-mix a **dry stucco blend** (manure, clay, and sand), packaged for convenience.

        - Consumers or contractors can easily purchase the mixture, by bag or by trailer, and activate it with water as needed.
    - This system introduces structure without full industrialization, allowing for broader distribution while maintaining environmental and logistical sensibility.

This manure-model pairing offers a clear path forward, aligning material properties with appropriate logistical systems, and balancing sustainability, practicality, and impact.

While initial testing and consultation with Antonia Vincenza suggest that fresh manure offers superior waterproofing properties, we strongly recommend further chemical and physical testing to confirm the performance differences between fresh and dry manure. This data would provide a stronger foundation for future decision-making.

That said, the analysis shows that both production cycles, individual on-site production and small-scale on-farm production, can coexist. Each serves different needs and logistical realities, offering flexibility based on regional demand, available infrastructure, and stakeholder capacity.

Ultimately, this study did not identify a single “winning” model. The range of variables, market demand, user behavior, regulatory requirements, and supply chain logistics, introduced too many uncertainties to definitively recommend one path over the other within the scope and timeframe of this project.

However, one conclusion stands out clearly:

Large-scale industrial production contradicts the core philosophy of this initiative. It shifts the focus away from environmental stewardship and local empowerment, risking a replication of the very systems this project seeks to challenge.

In essence, the path forward lies not in centralizing, but in empowering local solutions, guided by nature’s principles, responsive to human needs, and rooted in place.

Public views on this project

Up to this point, the report has largely relied on logic, deductive reasoning, and sustainability frameworks rather than hard market data. One major question remains unanswered:

“Will anyone actually use this?”

The success of this initiative depends not only on the viability of the product itself, but on whether farmers, contractors, and consumers are open to adopting it. Without stakeholder buy-in, even the most sustainable solution remains hypothetical.

To address this gap, the following section presents insights gathered from interviews with key user groups. These conversations aim to gauge interest, identify potential barriers, and better understand whether the proposed “farm-to-wall” model can gain real-world traction.

Farmers

Given that farmers are at the heart of the manure and nitrogen crisis, their perspective is critical in assessing the real-world viability of the proposed stucco solution. Two farmers—each representing different agricultural practices—were interviewed during the course of this project. Their feedback provides valuable insight into the feasibility and appeal of participating in such a system.

1. Biological Farmer ~ This farmer was open and supportive of the idea. While he personally does not face a surplus manure issue, since, as a biological farmer, he can reintegrate it fully into his own system, he saw potential for other farmers. His view:
    a. If the system allows farmers to profit from what was previously a cost, it could be attractive.
    b. His main caveat: investment costs must remain low to make adoption feasible.
2. Traditional Farmer ~ This farmer was initially skeptical, both as a producer and a consumer. He questioned whether this approach truly addresses the root of the manure/nitrogen crisis. However, when asked if he would reconsider if the manure could generate income, his attitude shifted:
    a. The idea of monetizing manure made him more receptive.

b. He acknowledged that with the right incentives, the concept could gain traction.

Framing manure as a resource rather than a burden is essential. Financial incentive is the strongest motivator; if farmers are rewarded, rather than penalized, for their role in this system, their willingness to engage increases significantly.

Contractors

Contractors are a vital link in bringing this product to life, they are the ones who handle the material, apply it with skill, and ultimately shape the final aesthetic that consumers see. Their acceptance is non-negotiable for successful implementation. To assess their perspective, contractors were asked a series of targeted questions aimed at evaluating both practical feasibility and professional willingness to adopt the manure-based stucco.

The following questions were posed:

1. What is your first impression of using this natural, sustainable plaster mixture?
2. What requirements must a product meet for you, as a professional, to use it with confidence?
3. Do you foresee any challenges in relation to building regulations, customer expectations, or quality standards?
4. What kind of support (e.g., lab testing, technical documentation) would increase your trust in this material?
5. If this mixture proves more cost-effective without compromising on quality, would you consider using it?

One of the contractors interviewed brought with him a deep generational connection to stucco work, tracing his family's involvement in the craft back to 1621. His experience and openness to innovation offered valuable perspective—particularly as he had previously used cow manure as a wall coating in chimney areas. Historically, this was done without additives to prevent soot penetration, after which conventional stucco was applied. This familiarity with manure as a functional building material was encouraging, additionally he responded to the questions as follows:

1. The contractor was not unfamiliar with using manure in wall applications. His historical use case highlighted manure's practical insulating and sealing properties, validating the material's potential from a traditional craft perspective.
2. To be viable for professional use, the contractor emphasized the need for:

    a. Consistent quality
    b. Convenient packaging (either dry mix or earth-moist)
    c. Minimal odor (not everyone is used to “farmland air”)
    d. Reliable delivery timelines
    e. Competitive pricing relative to brown clay mortars
    f. Compatibility with modern tools, such as clay spray pumps
3. He recommended careful positioning of the product. Instead of “cow manure,” framing it as containing biodegradable livestock-based components that store nitrogen would likely improve market reception.
4. To build trust and credibility, the following tests were suggested:
    a. Hardness tests on straw and wood fiber boards
    b. Adhesion tests
    c. Fire resistance tests

He also mentioned that current building balance initiatives are investing heavily to include bio-based materials in life cycle assessments (LCAs), with subsidy potential for qualifying products.

5. If proven cost-effective and performance-competitive, he would adopt the product without hesitation. However, he noted a crucial concern: ensuring no contamination from pharmaceuticals, hormones, or veterinary treatments that may be present in manure.

Consumers

Arguably the most critical, and difficult, audience to convince is the end consumer. This group ultimately determines whether the product has a market. Fortunately, this is also where concrete data was gathered to support the analysis.

A total of 25 randomly selected students and teachers from various disciplines at Inholland University of Applied Sciences were surveyed. Each participant completed a Google Form after physically interacting with one of the stucco samples produced during the testing phase. This hands-on engagement provided a more informed basis for their opinions. Please see below the results

What are your thoughts on the materials texture? (Please exclude the wood)

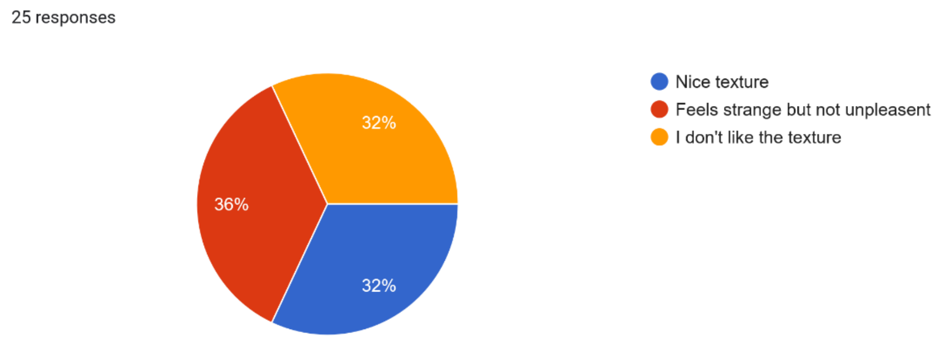

Figure 13 ~ Thoughts on materials texture

What material do you think it is?

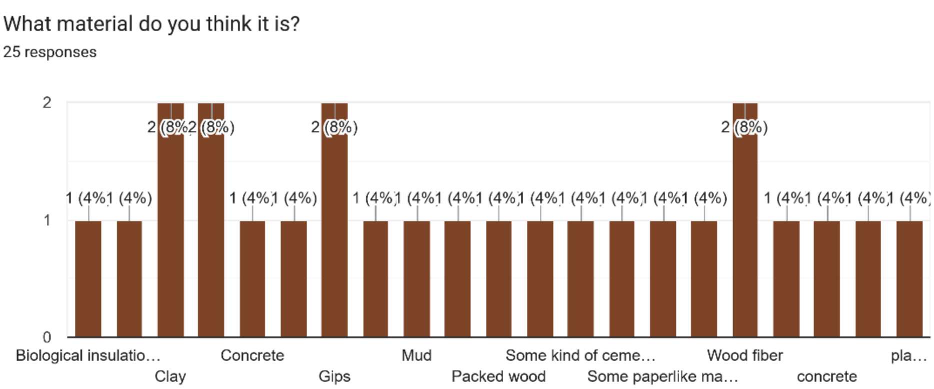

Figure 14 ~ What material do you think it is

Would you have this material on your wall?

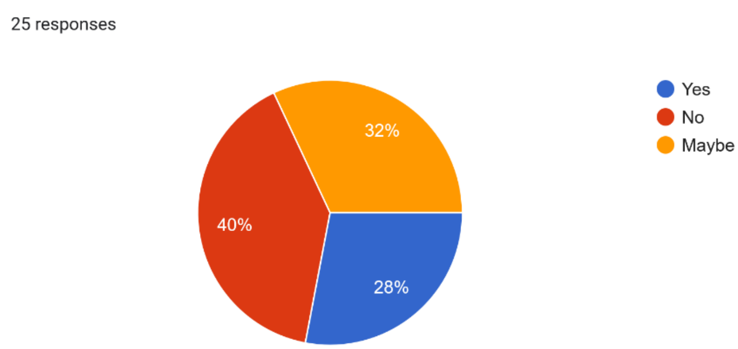

Figure 15 ~ Would you have this material on your wall

If you said maybe for the question, what is your hesitation?

10 responses

- Don't know how it will resist against humidity
- wall can be more hard
- -
- If it isolates well, then great, if you can stick stuff on it/paint it then for sure probably
- I am not sure about the resistance to damage
- Texture and colour are not atractive
- Looks like it rots
- Not sure if its flammable
- Smells like shit apparently
- It's hard and not very pleasant to look at

Figure 16 ~ Whats the hesitation

What do you think it smells like?

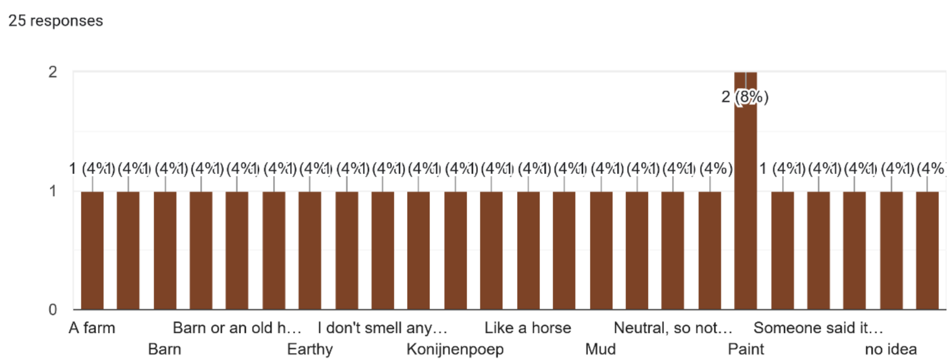

Figure 17 ~ Think it smells like

Where do you see this material being used?

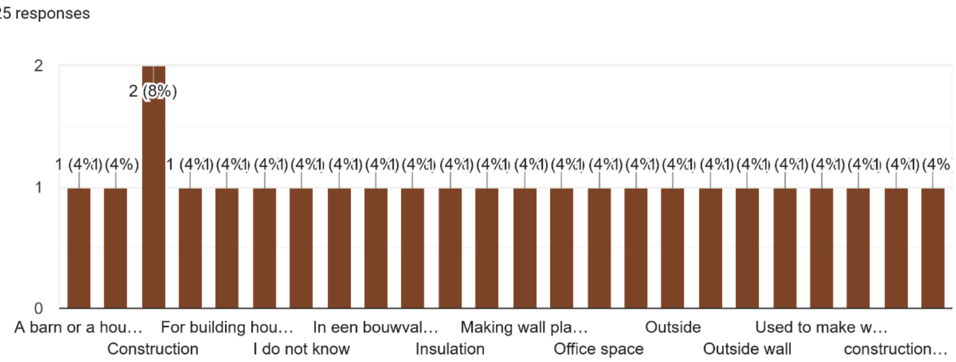

Figure 18 ~ Material usage

Before continuing with the second part of the questionnaire, participants were presented with the following statement: “What if we told you the material in question was made with cow manure. Now answer the same questions, seeing if your opinion has changed.”

This shift aimed to assess how awareness of the material’s origin, specifically its use of cow manure, would impact participants’ perceptions of the product. The goal was to test not only first impressions based on look and feel, but also the social and psychological acceptance of using manure-based building materials in real-world applications.

The following section compares the before-and-after responses to determine whether the material's origin had a positive, negative, or neutral effect on consumer perception.

Would you have this material on your wall?

25 responses

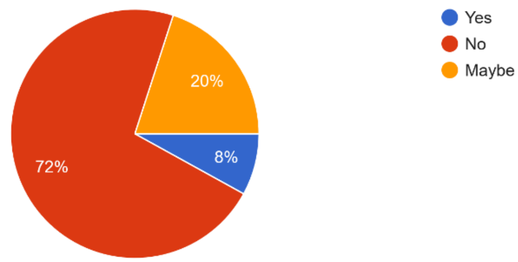

Figure 19 ~ Have on own wall

If you said maybe for the question, what is your hesitation?

Same reason as before the material hasn't changed my opinion:)

it can smel bad, and not strong enough

I don't know if it is strong enough

Will it smell after a while

if it gets wet for example, it might stink and unhygienic

Texture and colour are not attractive

How will it hold up over time?

Figure 20 ~ Why the hesistation to use

Did your answer change after knowing the material?

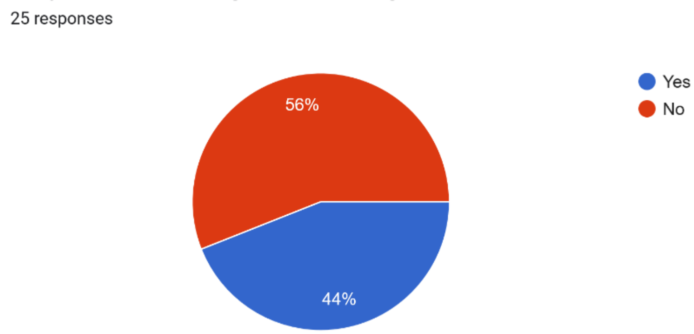

Figure 21~ Did your answer change

If you answered Yes, Why?

I does kinda smell like a cow but I thought my nose is just lying to me 😭😭😭😭

Because it shit

I'm afraid it would smell

The smell

Yucky :(

it's shit literally

I think I still saw a bit of residu in the middle

Probably good insulation

Just knowing you have cow manure on your wall

I got some new questions about the way it will hold up over time.

Figure 22 ~ If yes then why

The responses to the questionnaire highlighted the core challenge of using cow manure in stucco: "Just knowing you have cow manure on your wall." This psychological barrier alone led several participants to reject the idea, regardless of the material's appearance or performance. Additionally, while the physical interaction with the samples offered valuable first impressions, many were already hesitant due to the texture. Applying the material proved challenging for non-professionals, and while trying out the role of a stukadoor was engaging, it became clear that replicating a clean, professional finish requires skill. This likely influenced some participants' negative responses.

Another key takeaway is the potential power of reframing. If marketed as "bio-stucco" or "natural plaster" rather than explicitly as "cow manure stucco," public perception might shift. This could help move the narrative from discomfort to sustainability and innovation.

However, should this project continue, the following would make a great addition:

- A comparison panel: traditional stucco vs. manure-based bio-stucco
- Testing of alternative naming/branding strategies
- Questions focused on sustainability values and willingness to accept eco-material.

Lastly, a lot of people comment on the odor. Although smell during production was minimal compared to raw manure, some participants still perceived a lingering scent. This suggests an avenue worth exploring: the incorporation of natural essential oils or plant-based aromas to neutralize any residual smell and improve sensory acceptance.

Conclusion

Based on the research, interviews, and physical testing conducted for the Local Shit project, it is clear that the concept holds significant potential—but is still far from ready for real-world implementation. As Blaise Pascal once observed: "People almost invariably arrive at their beliefs not on the basis of proof, but on the basis of what they find attractive." This reality remains one of the project's greatest hurdles: despite its sustainability, the concept of using cow manure in building materials challenges cultural perceptions that are difficult to shift with logic alone.

Still, the project is not doomed. Throughout this honours program, several critical insights have emerged:

- Farmers are generally open to the idea, as long as it doesn't require significant time or investment and offers a financial return.
- Contractors are curious and open-minded, but emphasize the need for further testing and validation to confidently adopt the product in professional practice.

- Consumers are hesitant, with strong reactions to both the idea of manure in their walls and the lingering odor, even when minimal.

From a logistical standpoint, creating a feasible production chain proved complex, largely due to the freshness requirement of manure, which limits shelf life and transportation flexibility. By combining these practical realities with the Life Principles of Biomimicry, which promote local, adaptive, and efficient systems, it became clear that the most suitable production model for fresh manure is: “Individual On-Site Production”

This model stays true to the philosophy of keeping the “local” in Local Shit, reducing emissions, maintaining material integrity, and requiring minimal structural change from the key players involved. Whereas if dry manure does indeed function in a similar manor then utilizing the “small production on farm” would provide the best results.

Additionally with physical testing, hand on experience as well as learning to perfect the recipe and experimenting with colour, a winning combination of refining the clay and working with houtvezel plates and painting the stucco when dry is an ideal way to produce a smooth and ascetically pleasing result.

However, if given the opportunity the following can still be done:

- Chemical and physical testing of dry vs fresh manure
- Further discussions with farmers and especially contractors
- Further questionnaires with consumers but marketed from a bio-stucco view point

Although this projects results may not have been fully as expected when this project started, the door is still very much open for this project to become a reality, with a bit of fine tuning and creative marking, who knows maybe this shit can make its way up and down walls all over the Netherlands and help battle the nitrogen and manure crisis, as after all “a solution is beneath our feet, what we do with it now is up to us.”

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Appendix

Consumer questionnaire results:

Experimental
Material Social Experi

Video made to promote project: